

Paint Show . . . what's new . . . page 36

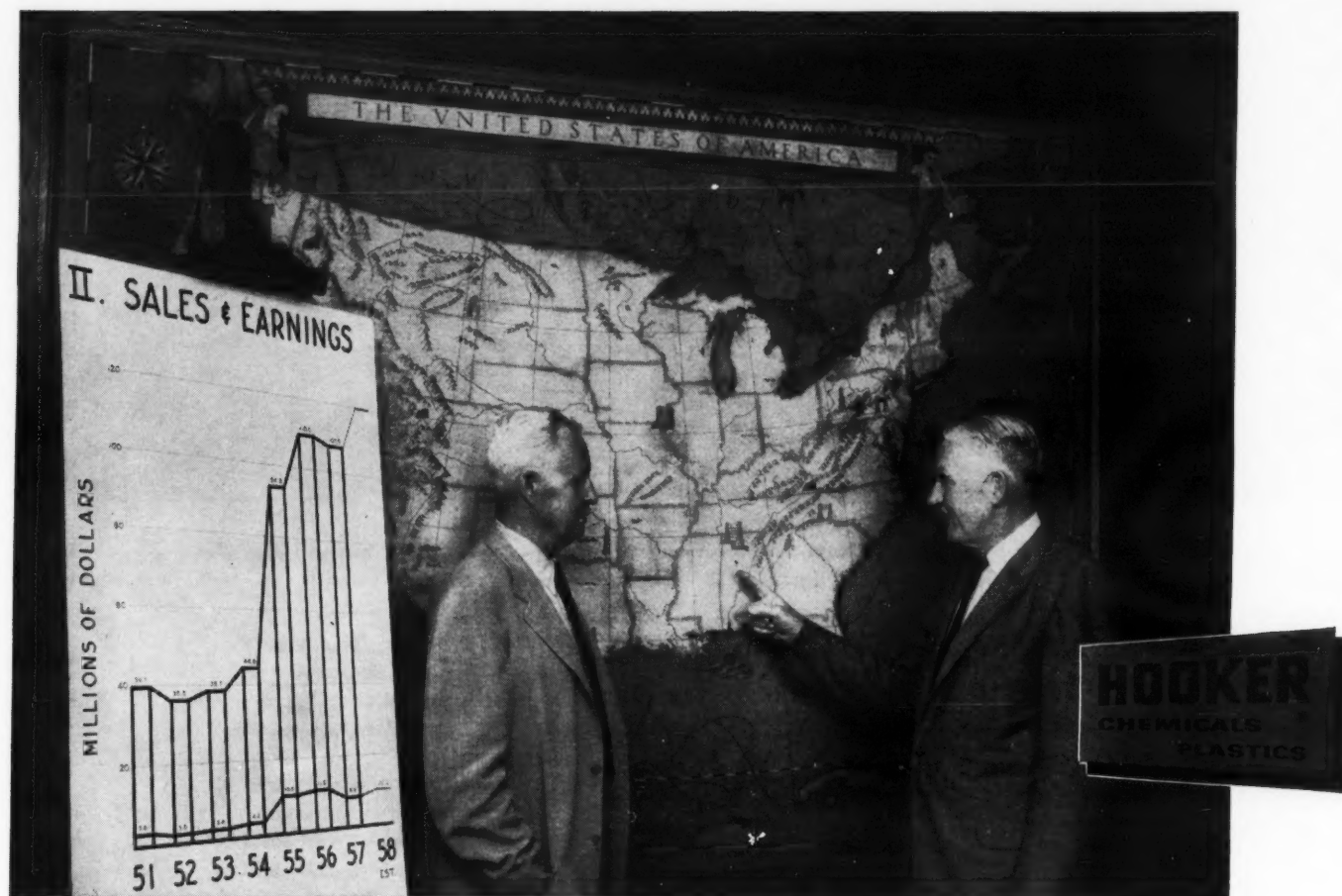
"Locked in" catalyst opens the door to silicone-rubber roll manufacture . . . page 47

. . . also more than 200 terse reports on new processing techniques, chemicals, instruments, equipment . . . page 6

OCTOBER 1958

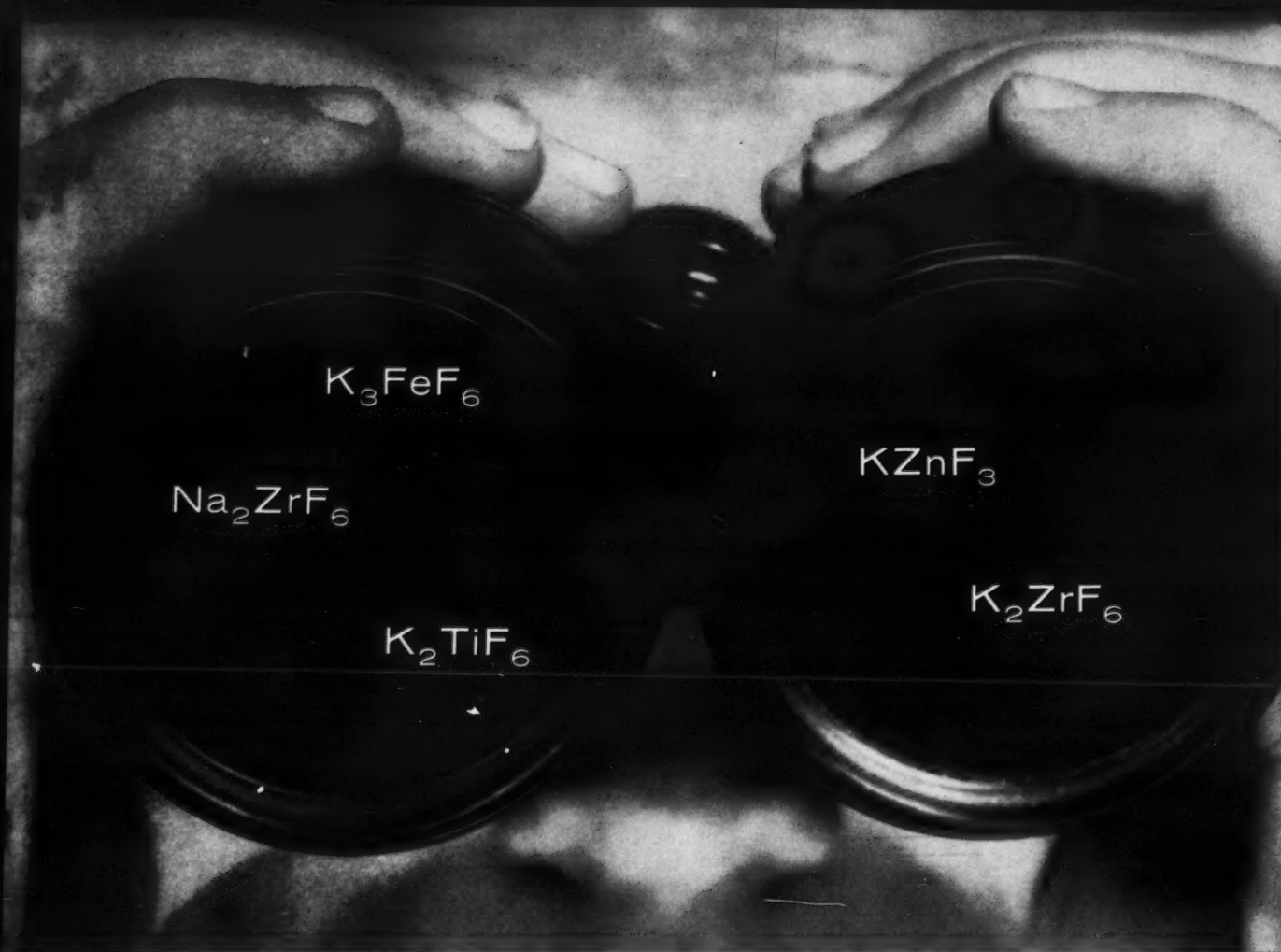


CHEMICAL PROCESSING



Hooker makes 'Big Climb' ...

Hooker's Murray and Moffitt check new southern plants
... latest data on sales and earnings ... page 32



Looking for **DOUBLE FLUORIDES?**

Look no further! Your best source for double fluorides (as for most other fluorine chemicals) is Baker & Adamson. Here's why.

B&A offers *seven* double fluorides. They are:

- Chromium Potassium Fluoride
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tremely wide range of fluorides manufactured by Baker & Adamson, as part of General Chemical's extensive fluorine program. You expect this scope from General Chemical, with its basic position in elemental fluorine, hydrofluoric acid and their raw materials . . . its manufacturing ability and versatility . . . and its major, continuing research in fluorine chemistry and technology. General Chemical leads today in virtually *every* aspect of fluorine research and production . . . and this specialized knowledge is at your service.

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Do you know that the magazine can come to you personally without charge, to your designated address?

If you . . .

would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

Perhaps . . .

others in your company would also like to receive **CHEMICAL PROCESSING** personally each month. Include their names on the form opposite the back cover.

Your application for subscription is welcomed.

For more information on product at left, specify 1507 see information request blank opposite last page.



THAT'S INTERESTING

Cancer fight beachhead

Major breakthrough in fight against cancer has been reported by five Japanese biochemists of Mie Prefectural University. For first time in long struggle with this killer a chemical difference between normal and cancer cells has been discovered.

The chemical, a fatty substance designated a "malignolipin," is composed of choline, spermine, phosphoric acid, and one or more fatty acids. Discovery promises a test for early diagnosis and means to find basic causes. (Poro-Scope, Pall Corp.)

Chemists' best years

Recent study of 2500 of world's ablest chemists reveals that their best creative work was accomplished between ages of 30 and 34. (U.S.I. Chemical News, U. S. Industrial Chemicals Co.)

For more information on product at right, specify 1508 see information request blank opposite last page.



*A trademark for Phillips Family of Olefin Polymers.

At new polyethylene plant . . .

Phillips uses *Airstream* Conveyors for bulk materials handling

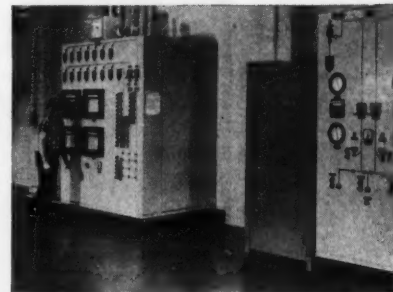
Phillips Chemical Co. uses Dracco Airstream Conveyors for bulk handling of polyethylene at its Pasadena (Texas) plant. Three main conveyor systems, consisting of a dozen sub-systems, total 10,500 feet in length. These provide high-volume, high-purity handling demanded by Phillips' advanced processes.

All systems are closely integrated with production from the time polyethylene becomes a dry bulk material until it is shipped to plastics processors. Handling is contamination-free. Controlled atmosphere conveying techniques, with inert gas as the conveying medium, are used as required.

Centralized, automatic control is extensively employed.

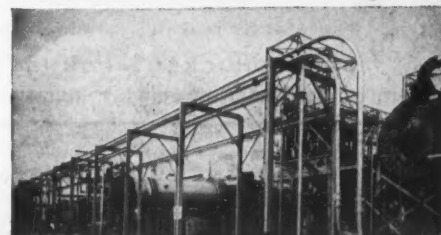
The Dracco systems at Phillips exemplify the future potential of pneumatic conveying in meeting industry's needs for handling dry materials in bulk throughout production. Design and fabrication required a comprehensive "systems approach" to air conveying, incorporating intimate knowledge of instrumentation, production processes, continuous flow principles, construction materials and bulk material characteristics.

For this approach to your handling problem, contact Dracco today.



Typical conveyor system control panels at Phillips. All systems are completely interlocked to block out control equipment on other panels which may conflict with a given conveying operation.

Pneumatic handling starts at dryers. Closed-circuit system uses inert gas to convey "fluff" polyethylene to processing building.



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FULLER CO.
4070 East 116th Street • Cleveland 5, Ohio

DRACCO *airstream conveyors*
dust control equipment

PACKAGED AIR HEATERS by THERMAL

Extreme compactness, high efficiency and versatility of operation are the chief characteristics of the THERMAL Type CA direct fired air heater. Designed around the high velocity THERMAL burner, it normally requires no refractory, since combustion is limited almost entirely to the burner itself. Adding to its versatility, the CA air heater performs equally well on gas, oil or combination firing and can be adapted to all pressure levels.

Type CA air heaters are most frequently sold as "packaged" units complete with all necessary safety and control apparatus. These units will provide outputs ranging from 200,000 BTU/hr to better than 30,000,000 BTU/hr and at temperatures from 300F to 1500F or higher.

Type

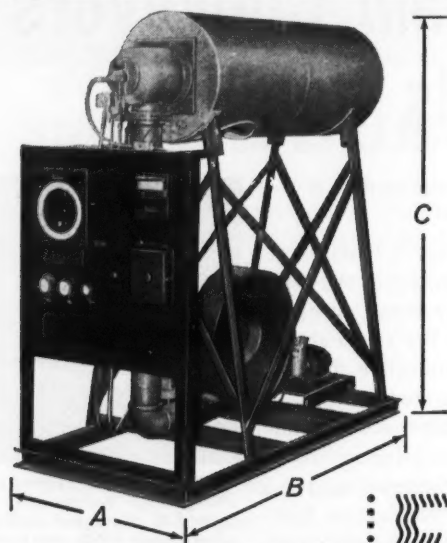


direct
fired

TYPICAL SIZES . . .

Listed below are the overall dimensions of a few of the dozens of output, temperature, and flow combinations possible in these heaters. Figures are for atmospheric pressure units. Higher pressure heaters would be smaller.

BTU/hr	AIR FLOW scfm	TEMP. IN °F	TEMP. OUT °F	A ft.	B ft.	C ft.
800,000	1,000	60	750 F	2½	4½	4
2,500,000	5,000	60	500 F	4	7	6
4,000,000	16,000	700	900 F	7	11	8
10,000,000	8,500	60	1,000 F	5½	10	8
15,000,000	10,000	60	1,200 F	6	12	8



Write for Bulletin #112

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Transfer Equipment

Check 1509 opposite last page

CHEMICAL PROCESSING

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and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 21

October 1958

No. 10

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Drugs & medicines
Soap & cleansing products
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Fertilizers

Animal & vegetable oils & fats
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
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CHEMICAL PROCESSING



that's interesting

Thought-provoking slants
on projects and products

Sensitive eye

An infrared "eye" can detect evaporation from one droplet of a specific chemical in an average room. System detects substance by its infrared spectrum and is not normally set off by any other materials present. Lopair (long-path infrared) was developed by Farrand Optical Co., Inc., New York, N.Y.

'Strokes' in plants

Tomatoes, cotton, and other plants sometimes suffer "heart attacks" or "strokes", according to Drs. Walker and Stahmann of the University of Wisconsin. Fungi invade the vascular system of a plant and produce an enzyme that attacks the pectin. Pectin fragments plug conducting vessels just as a clot blocks blood vessels in a human being. (133rd National Meeting of ACS)

First aid—first class

Humidity, fog, dew, rain, or snow will no longer stay E. D. Bullard Co.'s first aid packs from the successful completion of their appointed task, being on-the-spot in number one condition for emergency treatment. A polyethylene wrapper keeps units fresh, dry, and clean despite weather, chemicals, grease, and dust.

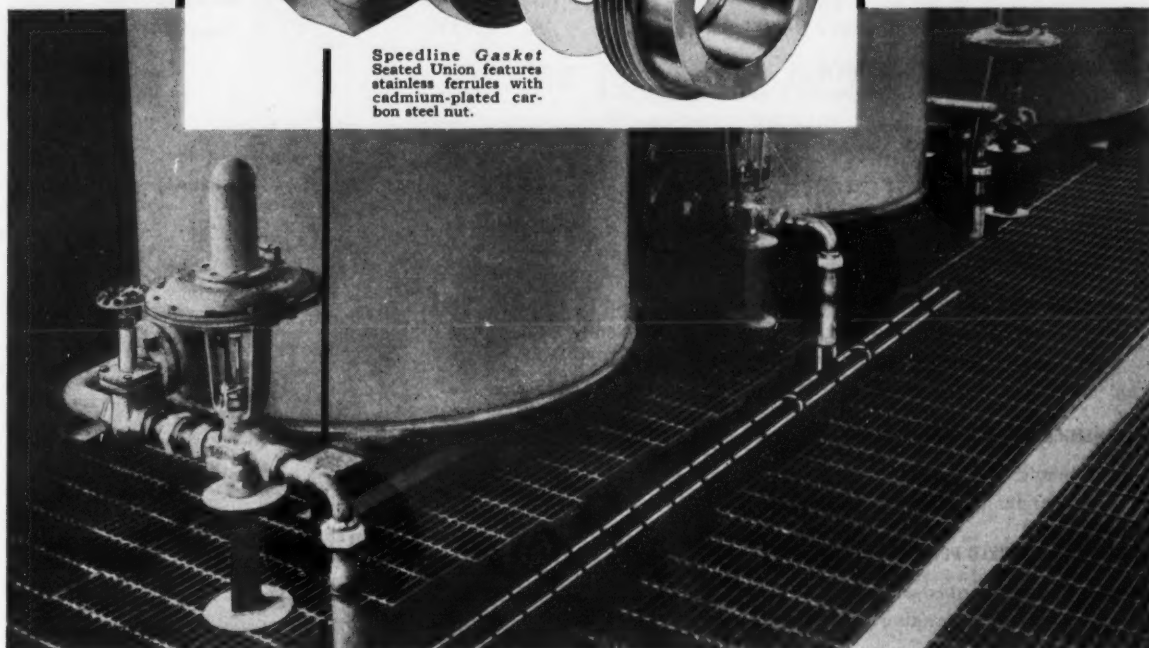
High-pressure bottle

Continuous windings of glass fiber, impregnated with epoxy resin, have been used to form a bottle for high pressure storage of liquid and gases. Normally spherical, bottles can be fabricated to handle from 100 to 5000 psi. Units were designed by Apex Reinforced Plastics, Cleveland, Ohio to meet high-pressure, low-weight air reservoir requirements of jet aircraft.



Speedline Gasket Seated Union features stainless ferrules with cadmium-plated carbon steel nut.

SPEEDLINE FITTINGS SOLVE LEAKAGE AND ASSEMBLY PROBLEMS



SPEEDLINE IS A REG. T. M. OF HORACE T. POTTS COMPANY

Here's the stainless steel union to eliminate troublesome ground joints. The Speedline Union is *gasket seated* to eliminate leakage . . . *bi-metallic* to permit easy disassembly and make-up *without* galling or seizing. It's available in two styles . . . for welding or expanding to low cost Schedules 5 and 10 pipe and the complete line of Speedline fittings.

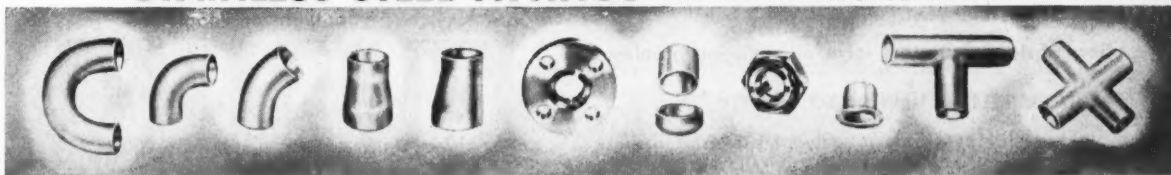
Advantages of Speedline Unions simplified piping problems at American Alcolac's Baltimore plant . . . permits ready removal of process lines located beneath floor grating when necessary. Use of Speedline Fittings throughout the plant's piping system reduced labor and materials costs to a minimum . . . maintained high degree of process purity demanded in process operations.

The *complete line* of Speedline Fittings with the exclusive "extra length" feature, offer many assembly advantages and cost savings not possible with conventional fittings. Request your copy of Speedline Catalog today.



808

STAINLESS STEEL FITTINGS—FOR THE ULTIMATE IN PROCESS PIPING EFFICIENCY



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Check 1510 opposite last page

highlights



OCTOBER 1958
VOLUME 21 • NUMBER 10

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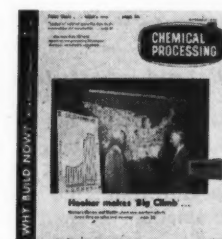
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THIS MONTH'S COVER

Hooker Chemical Corporation's board chairman, R. Lindley Murray, and president, T. E. Moffitt, stand next to chart showing the corporation's rising sales and earnings. Both natural growth and growth by acquisition have brought annual sales to more than \$100 million. This month's "Chemical Business Profile" (page 32) discusses this expanding, successful organization.



REGULAR FEATURES

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SPECIAL READER SERVICES

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• To subscribe to this magazine, see reader-qualification form opposite last page



over the editor's
shoulder



Ed Alpaugh (left) representing the National Safety Council presents Council's Public Interest Award to (left to right) CP assistant editor Ted Wett, editor John C. Vaaler, and publisher Russell L. Putman

For safety's sake

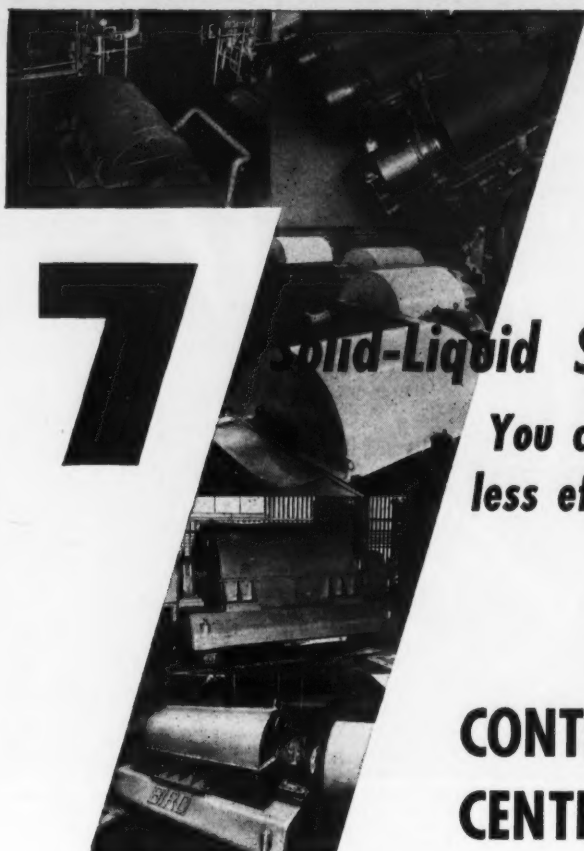
Again this year CHEMICAL PROCESSING magazine was privileged to receive the National Safety Council's Public Interest Award, for the fourth consecutive time. We feel a justifiable pride in this recognition by the Council of "... exceptional service to safety."

For safety's sake, each month a portion of the editorial columns of CP are devoted to bringing you the latest in applied safety and news about products that help to make your job safer. This month we turned to one of the largest and most dangerous chemical handling jobs in the country — moving missile fuels at White Sands — to point out the facets of this operation which we hope will help you do your job "the safety way" (see page 180.)

The chemical industry is one of the safest in the country. We at CHEMICAL PROCESSING feel that it's part of our job to try to maintain that rating by pointing out safe practices and procedures whenever possible. But ultimately the job is up to you. You're all familiar with Smokey the bear and the slogan, "Only you can prevent forest fires." Well only you, by management policy and hard work, can be sure you're working "for safety's sake."

Sheldon H. Felt

Associate Editor



Solid-Liquid Separation SAVINGS

You can make by replacing old or less effective filtering equipment with

BIRD CONTINUOUS SOLID BOWL CENTRIFUGAL SEPARATORS

1

YOU SAVE EQUIPMENT

The BIRD does the entire job — no filter media to fill up, clean or replace; no vacuum or filtrate pumps; no complex controls.

2

YOU SAVE SPACE

The BIRD takes up less operating space per unit of processed material than any other filtering equipment.

3

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The BIRD is a complete, self-contained unit. You just hook it up to the power supply, feed line, solids and filtrate receivers and you're ready to run.

4

YOU SAVE PROCESS EXPENSE

The BIRD does a thorough and uniform job of deliquoring; filtrates are usually so clear that further treatment expense is eliminated.

5

YOU SAVE POWER

The BIRD is built in the right size for the job — provides the correct combination of capacity and bowl speed for minimum power cost.

6

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The BIRD is a simple, sturdy, self-reliant machine. It runs without attention and with almost no supervision.

7

YOU SAVE MAINTENANCE

The BIRD runs and keeps on running, often for years without major overhaul or parts replacement. All it requires is routine lubrication.

Get an actual cost comparison of your present filters as against Birds. The Bird Research and Development Center has the facilities to give you prompt and precise test data and cost estimates.

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Harold Blakney (right), Maintenance Manager, Brown Company, Berlin, N. H. Left, Frank Hiltz, Vice President Brown Wales Co., Cooper Alloy distributors, Auburn, Me. Center, Cooper Alloy 8" angle circulating valve on digest tank.

BLAKNEY of BROWN COMPANY tells why Cooper Alloy Valves suit him

Q. Mr. Blakney, why does Brown Co., a leading manufacturer of pulp, paper, and other forest products, use stainless valves and fittings in its mills?

A. Because stainless steel is one of the few materials that can take the tough corrosion punishment of pulp mill digester fluids.

Q. Why Cooper Alloy valves?

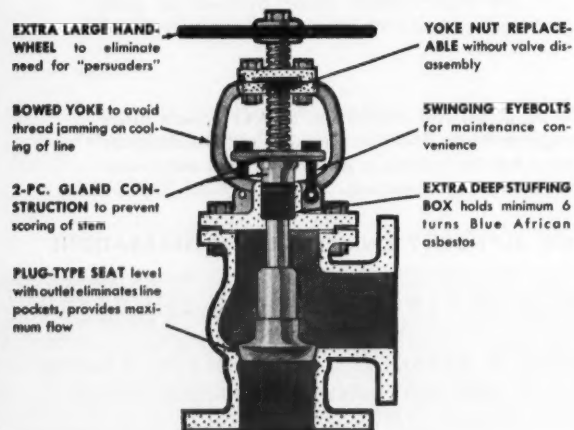
A. For long life and low maintenance. Over the years Cooper Alloy valves have proven themselves to be extremely well designed for the tough service we give them.

Q. How, specifically?

A. Well, these 8" angle valves, for example, have that extra-deep stuffing box to give a tighter stem seal. The seat, level with the outlet, eliminates line pockets and provides maximum flow. These plus extra large hand-wheel all give me less maintenance problems.

Q. Anything else you like about Cooper Alloy valves?

A. Yes, I like the engineering service available from Cooper Alloy we have had occasion to use, and the fine fast delivery and service we obtain from Brown Wales' nearby warehouse.



A VALVE DESIGNED FOR STAINLESS! The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless!* Check the Special Design Features shown at left.

As the little CA man below is saying: "You can tell a Cooper Alloy Valve as far as you can see it!" Write today for your copy of our folder "Valves and Fittings in the Pulp and Paper Industry." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves and fittings, and their advantages. He can serve you promptly from local stocks.

COOPER & ALLOY

Corporation • Hillside, New Jersey

FOUNDRY PRODUCTS DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

Check 1512 opposite last page



conventions
and exhibits

October 5-8. Federation of Paint and Varnish Production Clubs, 36th Annual Meeting, and the 23rd Paint Industries' Show, Cleveland Public Auditorium, Cleveland.

October 5-8. National Association of Corrosion Engineers, Northeast Regional Meeting, Somerset Hotel, Boston.

October 8. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

October 14-16. Society of Industrial Packaging and Materials Handling Engineers, 1958 National Industrial Packaging, Handling and Shipping Exposition, Coliseum, Chicago.

October 15-17. National Association of Corrosion Engineers, North Central Regional Meeting, Cincinnati, Ohio.

October 20-22. American Oil Chemists' Society, Fall Meeting, Sherman Hotel, Chicago.

October 20-22. Thirteenth TAPPI Plastics-Paper Conference, Sheraton-Kimball Hotel, Springfield, Mass.

October 20-24. National Association of Corrosion Engineers, South Central Regional Meeting, Roosevelt Hotel, New Orleans.

October 20-24. National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

October 21. American Society of Safety Engineers, Annual Meeting, Conrad Hilton Hotel, Chicago.

October 26-28. Scientific Apparatus Makers Association's Laboratory Apparatus and Optical Sections, Mid-year Meeting, Westchester Country Club, Rye, New York.

October 27-31. American Society for Metals, National Metal Exposition and Con-

... Meetings and shows of interest to the chemical industries

gress, Cleveland Public Auditorium, Cleveland.

October 28. Association of Consulting Chemists and Chemical and Chemical Engineers, Annual Symposium and Banquet, Biltmore Hotel, New York.

October 30-November 1. American Association of Textile Chemists and Colorists, 37th Annual National Convention, Conrad Hilton Hotel, Chicago.

November 10-13. American Petroleum Institute, 38th Annual Meeting, Conrad Hilton, Palmer House, and Congress Hotels, Chicago.

November 12. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

November 12-13. Chemical Market Research Association, Fall Meeting, St. Paul Hotel, St. Paul, Minnesota.

November 17-21. Eighth National Plastics Exposition, Society of the Plastics Industry, Inc., International Amphitheatre, Chicago.

November 25. Manufacturing Chemists' Assn., Eighth Semi-annual Meeting and Winter Conference, Hotel Statler, New York.

November 30-December 5. The American Society of Mechanical Engineers, Annual Meeting, Statler & Sheraton-McAlpin Hotels, New York.

December 1-3. American Society of Refrigerating Engineers, Semi-annual Meeting, Hotel Roosevelt, New Orleans.

December 1-5. 23rd National Exposition of Power and Mechanical Engineering, The American Society of Mechanical Engineers, Coliseum, New York.

December 7-10. American Institute of Chemical Engineers, Annual Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.

Picking a Plant Site takes experts on many things!



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- Investigate all tax and zoning laws
- Check proximity of raw materials required
- Report on market accessibility and entire marketing area
- Study housing, school and all community facilities
- Condition the community for industry acceptance
- Furnish complete information on rail, air, highway and water transportation.

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Check 1513 opposite last page

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By using Taylor-Wharton Gas Transports gas storage becomes flexible. This provides substantial savings and greater mobility of operations. Oil refining, petrochemical, food processing and electronic companies can make good use of these Taylor-Wharton transports to cut costs and expedite interplant haulage. Each tube meets I. C. C. 3A2400 specifications and is completely heat treated. Standard Transports have capacities ranging between 38,500 cu. ft. to 56,250 cu. ft. Each transport consists of a group of 2400 p.s.i. seamless steel storage pressure tubes rigidly mounted to a single or double axle model trailer.

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HARRISBURG STEEL CO.

Division of HARSCO CORPORATION



CYLINDERS



TUBES



FLANGES



COUPLINGS

Check 1514 opposite last page



Watching Washington

Small CPI Business Receives Support From Congress

If you are a chemical processor employing fewer than 250 — in some cases more — you may be eligible for new small business benefits.

First, the guardian agency, the Small Business Administration, set up as temporary in 1953, now occupies a permanent place on the Federal executive scene. Thanks to the Congress, the agency also received a substantial increase in operating funds. This new set-up insures continuity of SBA's program of assistance.

The dollar limitation on business loans is upped from \$250,000 to \$350,000 for each concern. Maximum interest rate on SBA's share of business loans is cut down from 6 to 5½ per cent.

Local Credit Aids

Perhaps the most far-reaching victory for small business is measure which establishes local investment companies to make long-term loans and equity financing available to the small-businessman. Passage of this bill climaxed a legislative struggle which began eight years ago when Senator John Sparkman (D., Ala.) introduced a measure designed to improve the sources of long-term capital for small business. As chairman of the Small Business Committee, he spearheaded a drive to get this proposal on the statute books.

Initial impetus for loan legislation came from studies by Committee for Economic Development, Investment Bankers Association, and Smaller Business Association of New England.

Further studies conducted last year by the Federal Reserve Board revealed that the main problem of the small company was borrowing money to stay alive. The reason — high interest rates and short maturities, plus wariness on the part of most organizations to take chances with the small borrower.

This lack of credit availability was pointed to as the major factor in decline and

fall of more than 300,000 small businesses every year.

Long-Term Loans Available

Specifically, the bill authorizes SBA and the states to charter small business investment companies which in turn can make long-term loans (20 years) or invest risk capital directly in eligible businesses. Money to start up an investment business will come out of a \$250 million revolving fund appropriated by Congress.

Local small business investment companies must be formed by at least ten persons with minimum capital and surplus of \$300,000, half of which they can get from SBA for the asking. These companies will not be allowed to lend more than 20 per cent of the total capital of the small business requesting the loan.

How does SBA define small business? In wholesaling, annual sales of less than five million dollars are sufficient. In retailing and service, a gross of less than one million dollars makes a small business. A company is considered a small business if it employs 250 or fewer, and large if it employs more than 1,000. Classification of companies employing somewhere between these two figures is based on type of activity.

The chemical and allied products industry is divided into various categories — for example, the employment size standard for soap and glycerine companies is 1000, fatty acids — 500, fertilizers — 500, and biological products — 250.

If SBA administers the program forcefully and local investors cooperate, this program holds great promise for small-business financing.

Some Tax Relief

In a surprise move, a special tax relief measure was also enacted for the small-businessman. It provides for investors who lose money in small-business ventures to write off their losses against ordinary income up to \$25,000 a year. Increased depreciation allowances, as well as extended time on loss carry-back privileges and estate-tax payments, are also included. The bill increases from \$60,000 to \$100,000 the amount of earnings that may be retained without incurring high tax charges.

Of this tax measure, Senator Sparkman said, "I am confident that the legislation will ease many of the most pressing tax problems. . ."

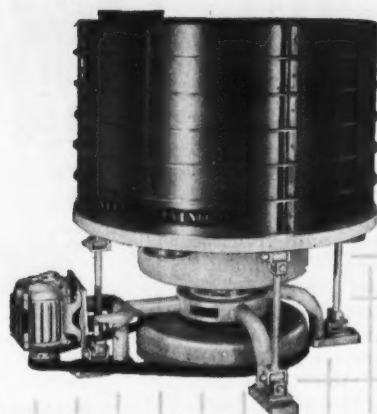
To Share Government Research Contracts

Under legislation which covers the Small Business Act itself, small business will be assured a more equitable share of research and development contracts placed by the government. SBA is also directed to obtain for small-business concerns the benefits of research and development work performed by others under such contracts or at government expense.

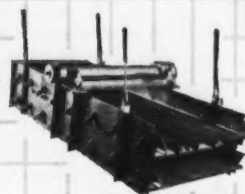
Moreover, small business concerns which gather together for joint programs of research and development work assisted by SBA may be exempt from antitrust actions in certain cases.

Space and contract-minded chemical processors will be interested in SBA's recent release of a list of companies holding contracts in the guided missiles program. Under the new service efforts are being made to develop sub-contracting opportunities for interested small firms, based on information compiled from government and private sources and from data obtained from missile contractors.

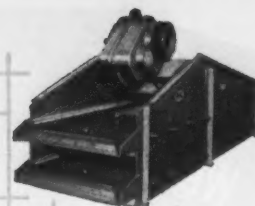
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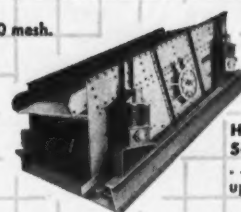
Stainless Steel Gyratory Screen
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... for separations up to 2½ inches.



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... screen apertures up to 12 inches.

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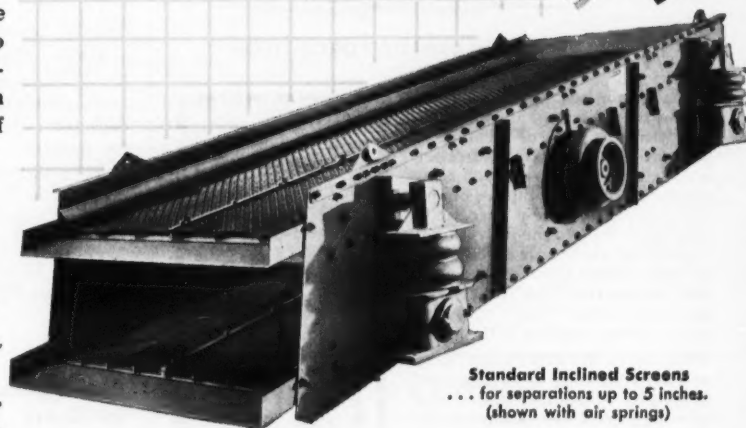
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(shown with air springs)



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A-5583

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Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

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Company _____
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City _____ State _____ Zone _____

Check 1516 opposite last page

WASHINGTON NEWS

From preceding page
Price-fixing charged to drug makers

Second blast at drug makers this year has come not from the Justice Department but from the Federal Trade Commission.

Simultaneous with release of FTC's report on antibiotics production, six drug companies were charged by the Commission with price fixing. The allegations were that "for many years" the companies had "fixed and maintained arbitrary, artificial, non-competitive and rigged prices" for tetracyclines.

The Commission also charged one of the companies, Chas. Pfizer, had "made false, misleading and incorrect statements to the United States Patent Office in order to obtain a patent on tetracycline." FTC said there was "no real novelty or invention in the claims of the patent . . ." and that the "alleged invention was in public use or on sale . . . more than one year prior to the filing of the application."

Difficult To Prove?

The six companies immediately denied the allegations.

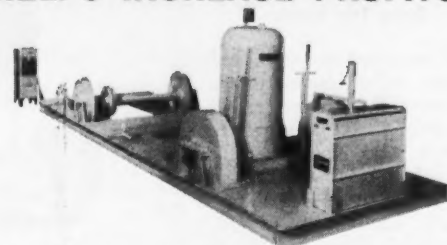
Many observers feel that the FTC in spite of long study and planning may have a difficult time substantiating its charges.

In addition to Pfizer, the other five companies charged are: American Cyanamid, Bristol-Myers and its subsidiary, Bristol Laboratories, Inc., Olin Mathieson and Upjohn.

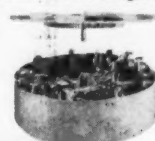
Research contracts available

Chemical processors should look into possibility of new business from the National Aeronautics and Space Administration which has just opened its doors. Set aside in the first year's budget of the new civilian space agency is \$75.8 million in contracts for private industry. Slated for research and development is \$187.2 million.

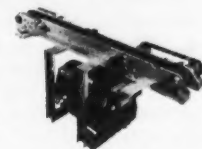
MECO Handling equipment with fingertip control . . . SAVES PRODUCTION TIME HELPS INCREASE PROFITS



A complete series of battery powered transfer cars for heavy duty use. Models for transferring dryer and rack cars or other heavy, bulky items. Two forward speeds and reverse, positive foot and hand brakes, or electric brakes, fingertip control. No trolley or other electrical connections needed. Selenium rectifier charges battery.



Electronically operated turntable speeds up loading, reduces operator fatigue. Rotates heavily loaded cars or racks to nine positions quickly and smoothly. Push button controls.

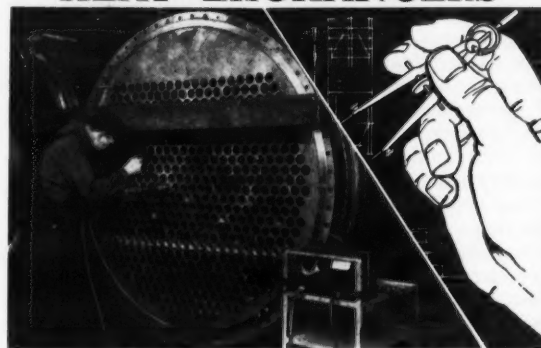


Heavy duty car pusher speeds loading of dryers and kilns. Capable of pushing 17 loaded cars into position. Mounts under track. Rugged construction means long life, minimum maintenance.

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Check 1517 opposite last page

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Check 1518 opposite last page

CHEMICAL PROCESSING

Pesticide effects on wildlife?

Pesticidal sprays and dusts will come under scrutiny of the Secretary of Interior as a result of a new law calling for a study of the effects of these chemicals on wildlife, fish and natural resources. The Interior Department will attempt to come up with just what amounts are safe for a minimum loss of fish and wildlife.

Government contract losses

If your company loses money while working on a government contract, Uncle Sam will not underwrite these losses. President Eisenhower, in vetoing a bill which would in effect do that for one particular company, had this to say:

"Every negotiated or fixed-price contract represents a risk voluntarily assumed presumably for the purpose of profit. This is the rule traditionally associated with our free enterprise economy . . . to depart from it would tend inevitably to bad practices and destruction of the advantages of competitive bidding." The President went on to say that had the contract been with a private party, the company would have had to accept the loss as part of the risks of business.

Puerto Rico's plastic products shipments to the U.S. have increased twenty-fold since 1952 and now top \$13.5 million a year. Using the latest available figures, a seven-page report estimates that net profits for this fast growing U.S.-affiliated industry range around 15.3 percent in relation to net sales. This is approximately four times the U.S. average for the industry.

Report also covers labor availability, factory space, incentives offered, and transportation costs. "The Fabricated Plastics Products Industry In Puerto Rico"—Office of Public Relations, Economic Development Administration, Commonwealth of Puerto Rico, 666 Fifth Ave., New York 19, N.Y.

Check 1519 opposite last page.

How Can CO₂ Help You?

"CO₂ applications are unlimited" . . . a broad statement, but literally true. New ways in which this most versatile of all gases is improving products, cutting costs and saving time and labor are being developed almost daily. Some of the applications discussed here will be of direct, primary interest to you. Other uses, while perhaps not in your immediate specialty, may well be adaptable to your field. Check the box by each application on which you'd like detailed, technical data and mail this coupon.

Your inquiry will receive prompt, professional attention from the chemical applications staff of the world's largest producer of CO₂.

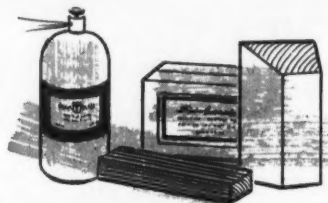


☐ **Economical, Efficient "Freeze-Drying"**—Freeze-drying is used to dehydrate heat sensitive substances at low temperatures. In the processing of blood plasma and the manufacture of penicillin, streptomycin and other pharmaceuticals, dry ice or liquid CO₂ is used to freeze the item being dried. Also, during the drying stage, dry ice is used to condense the moisture as it is sublimed under vacuum. Capable of quickly attaining and maintaining the extreme low temperatures required, CO₂ has the added advantage of requiring only a small capital outlay.



☐ **Precipitation of Carbonates**—Carbon dioxide in its gaseous form is used to

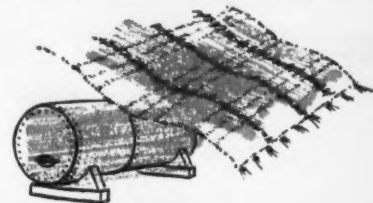
precipitate carbonates from water solutions. Ammonium bicarbonate and lead carbonate are examples. Bakeries and plastics manufacturers are among the many users of ammonium bicarbonate.



☐ **Simplifies Pulverizing of Materials With Low Melting Point**—Many substances tend to melt or smear because of the heat generated in a milling process. DDT and vegetable fat flakes which are waxy and Teflon resin which is very tough and elastic are examples. In the low temperature pulverizing process the ingredient is mixed with crushed dry ice or low pressure carbon dioxide liquid is injected directly into the ingredient. These methods effectively inhibit the melting or smearing, prevents plugging and reduces horse power requirements. Gaseous carbon dioxide is also used to form an atmospheric "blanket" to effectively prevent fire during the grinding of flammable materials. An example of this application is the grinding of phosphorus pentasulphide and flammable resin materials.



☐ **Fireproof "Blanket" For Stored Phenol**—Phenol is a toxic, corrosive, flammable compound and is stored in an inert atmosphere under slight pressure to reduce vaporization, prevent oxidation and at the same time provide a non-flammable atmosphere. Carbon dioxide is also used as a pressure medium in transferring liquid phenol.



☐ **Effective Inerting Agent**—There are many times when an inert atmosphere is needed to prevent fire or explosion. Before welding a tank that has been used for the storage of flammable liquid, CO₂ is used to inert the atmosphere in the tank so that welding can be done with no danger of explosion. CO₂, acting as an effective atmospheric "blanket," also prevents oxidation and "skinning" of paints and oils.

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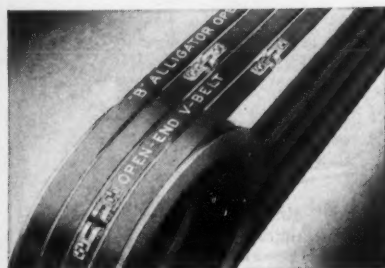
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OPEN-END V-BELTING ASSURES YOU OF...

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Check 1521 opposite last page



letters from readers

Maybe we helped

Dear Mr. Vaaler:

For your files I am sending you, under separate cover, copies of our associated newspaper, *The Gibson Record and Guide*, which carried reprints of your article, "Where Have We Failed In Education," (May 1958 CP, page 44).

Thank you again for permission to reprint. You may be interested in knowing that the school bond issue, which I mentioned in my last letter, was passed overwhelming today.

PHILLIP EDWARDS

Feature Editor

The Richmond County Times

Used equipment

Gentlemen:

I have read with interest the article of Mr. William R. Heins, "Have You Considered Leasing Production Equipment?", (May 1958, p. 29).

I certainly agree with... this article. However, I think there is room to go a little further.

There are many times when an engineer is faced with the design of a preliminary pilot plant operation to explore a new process or the market for a new product. In either event, the project is of questionable virtue and doubtlessly for a limited duration. The actual process may be subject to considerable change, and with exact specifications difficult to come by.

In addition, there might be some considerable difficulty in obtaining a capital expenditure appropriation for the entire project.

At a time like that, many engineers find the availability of used chemical processing equipment a Godsend. If properly purchased through reputable dealers, the initial savings may enable an entire project to be completed on a very limited budget.

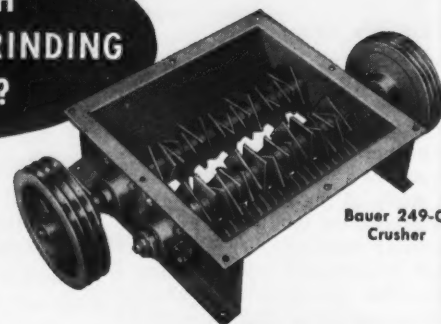
Some dealers will even arrange for temporary rental of such equipment under very attractive terms. This eliminates the necessity of liquidat-

FACED WITH CRUSHING OR GRINDING PROBLEMS?

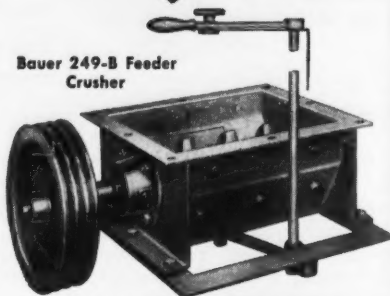
You can reduce bulky chemicals or industrial materials to a controlled, uniform, easy-to-process size with Bauer Crushers.

These units can be used independently or with Bauer attrition mills, hammer mills, breakers, granulators or fiberizers to speed the processing of virtually any type of material.

If you have a special problem in this field, the experience of our engineers and research staff is at your disposal with no obligation. You are invited to write for our No. 56 General Catalog.



Bauer 249-C
Crusher



Bauer 249-B Feeder
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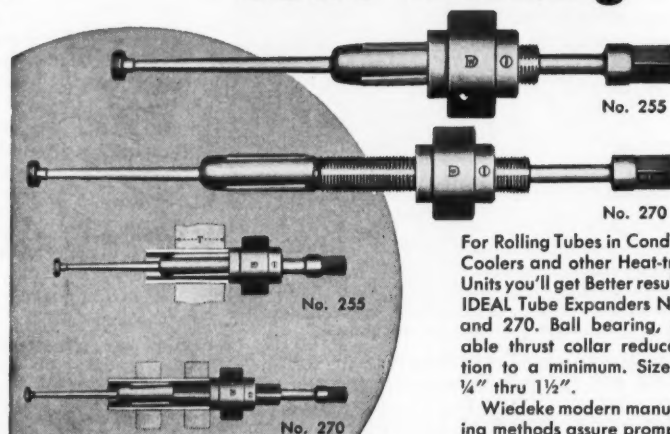
Bauer

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For Rolling Tubes in Condensers, Coolers and other Heat-transfer Units you'll get Better results with IDEAL Tube Expanders No. 255 and 270. Ball bearing, adjustable thrust collar reduces friction to a minimum. Sizes from 1/4" thru 1 1/2".

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THE GUSTAV **WIEDEKE** COMPANY
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Check 1523 opposite last page

CHEMICAL PROCESSING

LETTERS

ing a temporary project in order to write off the cost, and permits an accurate estimate beforehand of the actual cost of the project, and the budgeting of this cost in an orderly operational expenditure manner.

The used machinery dealer is as important to the new machinery manufacturer as the used car dealer is to the automobile manufacturer. A ready market for your old equipment makes you a potential customer for new equipment. I have seen this occur innumerable times.

SYDNEY KALVER

Professional Engineer
Brooklyn, N.Y.

Submerged combustion

Gentlemen:

The story on Page 73 of your July 1958 issue, describing the boron-caustic waste disposal problem at Callery Chemical Company, was most interesting. We do not want you to think that we are being unduly critical, but there is one point in this story we feel should be clarified.

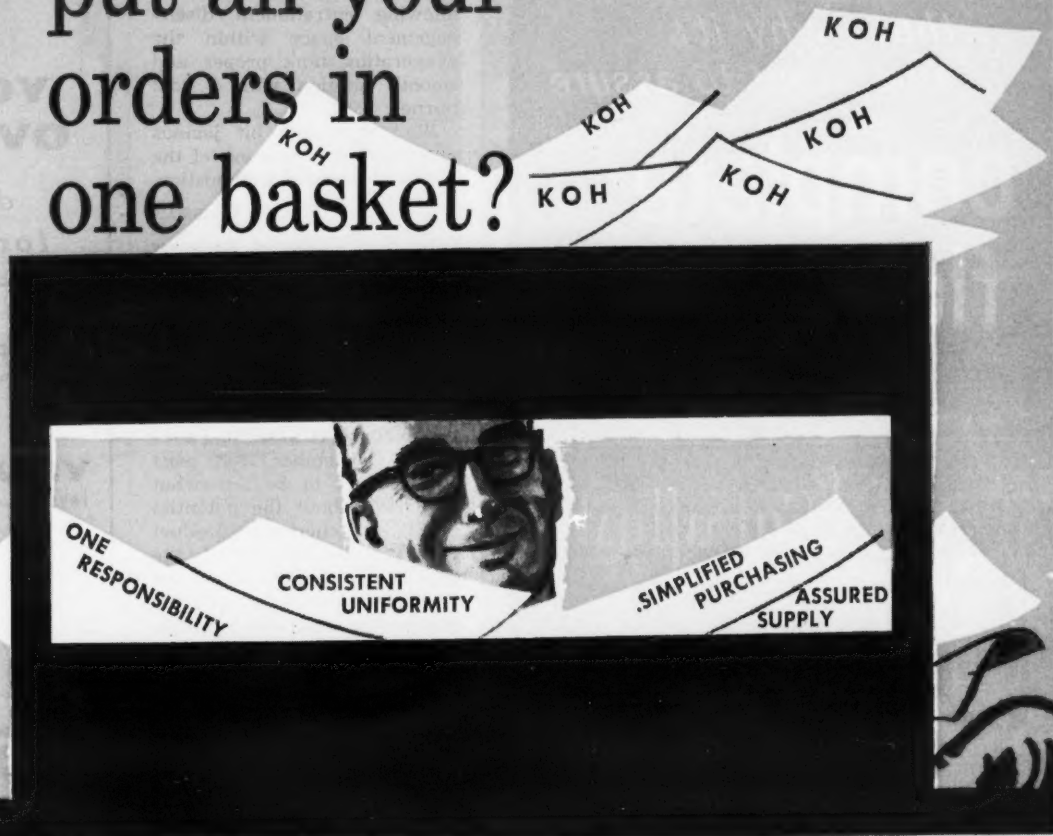
The generally accepted definition of Submerged Combustion is "burning of a fuel beneath the surface of a body of liquid". We think that most authorities on the subject would agree that any equipment in which the combustion does not take place beneath the surface of the body of fluid should not be referred to as Submerged Combustion.

From the description of the equipment in use at Callery Chemical Company, it appears the burner is mounted above the surface of the liquid, and the products of combustion are discharged under the surface.

Perhaps we are talking of a mere technicality, because in the case of the evaporator described it would seem probable that results obtained are essentially the same as those attained with a true Submerged burner.

Nevertheless, in many applications, particularly in corrosive solutions, we do believe

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A way to end the cost and confusion of piece-meal purchasing from numerous suppliers! Caustic potash, carbonate of potash, magnesium oxide, muriatic acid — *International* produces them all. In as great a quantity — and delivered just as quickly — as you wish.

But it's more than a matter of convenience. Behind the *International* brand you'll find unexcelled technical aid, research and resources... total support in every phase of product development and production.

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modern greases are not
always compatible...



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important to assure

**complete
flush** with

*Lubrifiush**

*exclusive
feature of...

U.S. MOTORS

Today's greases have different chemical bases—lithium, sodium, calcium, barium, and other bases which you can't be expected to know. Some of these greases will not mix safely with others. Because certain chemical bases may react with each other, mixed grease may not keep its consistency and excessive wear may result. Putting new grease in with old, you may mix greases so as to cause bearing damage. That is why U.S. LUBRIFLUSH—an exclusive feature of U.S. Motors—is increasingly important. With this transverse lubrication system, old grease is *completely* flushed out as new grease is forced in. There's no mixing. You can put in new grease without bothering to determine whether it's basically compatible with the old. LUBRIFLUSH, moreover, assures proper lubrication for longest bearing life. Another good reason to specify: "U.S. ELECTRICAL MOTORS."

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Check 1525 opposite last page

LETTERS

that there are inherent advantages to having the combustion chamber submerged, mainly in connection with materials of construction, such as our all-graphite Submerged Combustion burner, as well as allowing entrainment disengagement space within the evaporating tank proper and smooth ignition with a cold burner.

We are just a bit jealous about inappropriate use of the term, Submerged Combustion.

WM. I. WEISMAN

Chemical Engineer
Ozark-Mahoning Company

Product pipelines

Dear Sir:

Mr. Kopp (CHEMICAL PROCESSING, September 1958, page 42) appears to be somewhat optimistic about the potential effect of chemical product pipelines in developing the petrochemical potential of the Central States regions. Petrochemical activity in any given region seems to be contagious; it's a case of "them that's got, gets".

The prime factors to justify pipelines are large volume and technical feasibility, along with economical production and a market. So long as the petroleum refinery activity on the Gulf Coast is adequate to economically supply the raw materials, the chemical producing potential of Oklahoma and Kansas refineries does not appear competitive for the large markets.

Such products as benzene and naphthalene in pipelines encounter the technical problem of freezing points in the colder climate of the upper Midwest. Multiple-product shipment via pipeline requires either some tolerance for product contamination with the adjacent materials or ease of separating the mixed products.

If chemical recovery ever becomes a competitive necessity in the petroleum refining industry, like it has in the coal coking industry, the landlocked refineries of the south Central States region may develop pipelines as an eco-

for uniform results

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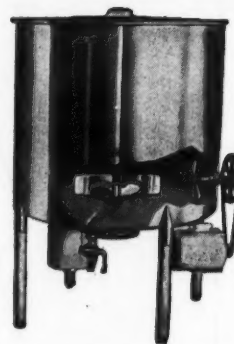
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CHEMICAL PROCESSING

LETTERS

nomical alternative, but will probably still be facing a transportation cost penalty in marketing many of their chemical products.

ROBERT S. McDANIEL
Chicago, Illinois

Moffitt tax plan

Gentlemen:

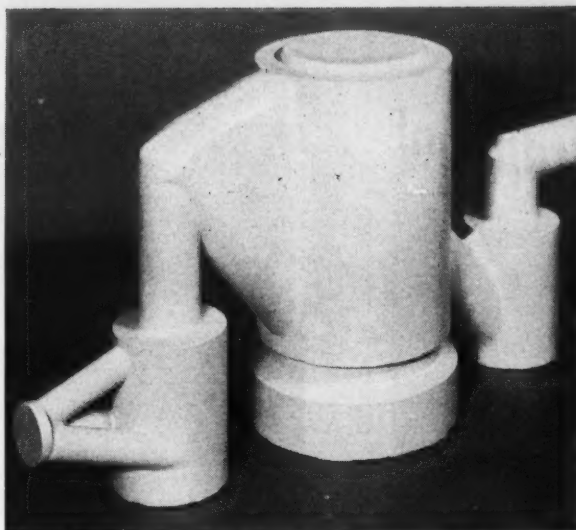
Mr. Chapnitsky's comments in July **CHEMICAL PROCESSING** (page 8), on my plan to make tax exempt increases in a corporation's pretax income, bring up a number of very interesting points.

Contrary to Mr. Chapnitsky's belief, the so-called Moffitt tax plan would actually curb the excesses in capital expansion which were contributory to the 1958 recession. In order to benefit from the tax plan I have proposed, a firm has to continuously increase its pretax profits. This means that a company cannot afford to invest in any capital expenditure that is not economically justified, or it will jeopardize its opportunity to improve its profit picture.

Furthermore, the incentive to gain tax-free income by becoming efficient will result in a greater number of well-managed firms which will in themselves be a deterrent to over-expansion or contraction. In addition, the increases in productivity from this incentive will help combat our wage inflation which many believe to be more dangerous than the threat of another recession.

As to a tax-cut, the revenue loss to the Government of any over-all tax rate decrease can be made up only by the taxes from firms that have managed to increase their pretax incomes. The efficient producers would then carry a larger share of the load, and the tax cut would become a subsidy for the inefficient producers and not a stimulus to the whole economy.

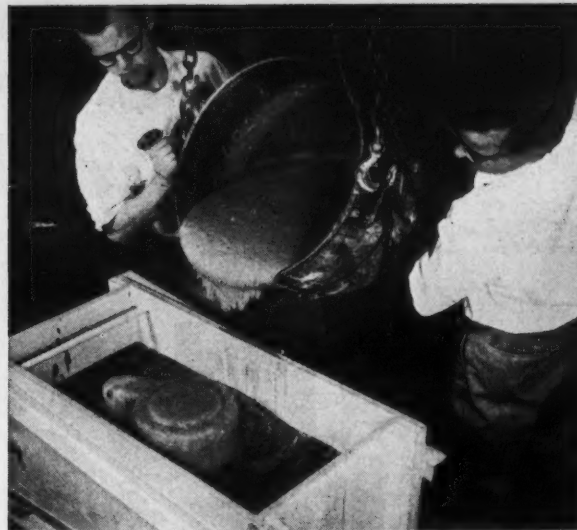
D. S. MOFFITT
Vice President
The Connecticut
Hard Rubber Co.
New Haven, Conn.



To shape the inside of the bromide-bromine liquor pump block, a form is made of plaster of Paris and Styrofoam®.



The plaster of Paris and Styrofoam material in the form is broken up and removed.



Dow Epoxy Resin 331 (casting formulation supplied by Ren Plastics, Inc.) is poured over the form and hardens.



Main part of bromine pump is installed, ready to operate without wear or corrosion.

Dow Epoxies help stop corrosion for chemical processors

This corrosion-free pump block adds another to the list of success stories made possible by new, pure Dow Epoxy Resins.

For years the main parts of bromide liquor pumps have been made with machined soapstone. Performance was inconsistent; the slightest crack or seam proved disastrous. But now Dow Epoxies open a new era of efficiency and economy for the chemical processing and corrosion fields. Easily cast to shape without costly machining, the epoxy pump blocks are impervious to the chemicals involved and free from the internal flaws of soapstone.

Have you a corrosion problem where Dow Epoxies may

help? Write for information and technical help. Dow is a basic producer of the raw materials used in epoxy production. In this way Dow provides raw materials with optimum properties to produce superior resins, to control quality carefully and to provide a narrower range of specifications in the finished resin—so necessary to uniform performance. For complete information and technical data on Dow Solid and Liquid Epoxy Resins, consult your Dow sales office. Or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 2265Q.



YOU CAN DEPEND ON

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CSC 2-Amino-2-Methyl-1-Propanol



USE ECONOMICAL **AMP** AS AN EMULSIFIER IN: water-wax emulsions, cleaners, polishes, dressings, self-polishing floor waxes and emulsion-type paints.

USE EFFICIENT **AMP** AS AN INTERMEDIATE IN SYNTHESIS OF: surface-active agents, detergents and vulcanization accelerators for rubber. Write for Samples and Technical Data.

Specifications	
Neutral Equiv.	88.5—91.0
Color, APHA, max.	20
Water, by Wt., max.	0.8%
Distill. Range	156°C—177°C
Below 161°C, max.	10%
Above 168°C, max.	5%
Odor	Characteristic
Non-volatile Matter by Weight, max.	0.005%

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CHEMICAL BUSINESS / Our Growing Industry



Technician in Dow's textile development group cleans off roller on a Zefran carding machine

Dow's Zefran Acrylic Fiber Swings into Production

The Dow Chemical Company's James River Division has started commercial production of Zefran, Dow's acrylic alloy textile fiber, near Williamsburg, Va. The \$10-million plant, under construction for 18 months, will produce 12 million pounds a year when it is operating at capacity.

The staple fiber will be delivered to textile mills in the South, Middle Atlantic area, and New England to support the launching of Zefran this fall in the apparel field. It is being introduced in women's coats, suits, dresses, sportswear, and knitted outerwear; men's year-round suitings and sportswear; children's wear. Main accent is on blends of Zefran with cotton, wool, rayon, other synthetics.

Based on polyacrylonitrile, and therefore related to the acrylic family, Zefran has sufficient differences in its composition, Dow feels, to justify the "alloy" designation. Special method of introducing a dye-receptive component into the fiber is reported to give greater flexibility in choice of dyestuffs, without sacrifice of inherent physical properties.

Other qualities of the fiber are dimensional stability, pleasing hand, and ability in fabric form to retain fresh appearance after long, hard wear. It will process on all conventional textile equipment.

Air Reduction Chemical Co., A Division of Air Reduction Co., Inc., is now producing vinyl stearate commercially at Calvert City, Ky.

The two-million-pound-per year plant is the fifth Airco facility to be completed since 1953 at Calvert City, where the company has invested over \$25 million in manufacturing operations. Construction has also been started on a sixth plant, to produce polyvinyl alcohol resin, upping company's investment in this area to almost \$40 million.

Vinyl stearate is based on acetylene produced from calcium carbide by Airco's National Carbide Company division at Calvert City. Stearate process was developed in the company's research laboratories.

Chemetron Corporation's National Cylinder Gas Division has broken ground for a \$1.75-million liquid oxygen, nitrogen, and argon plant in Compton (near Los Angeles), California. Production is scheduled for early 1959. Capacity

Check 1529 opposite last page

will exceed 30 tons of oxygen, nitrogen, and argon a day.

B. F. Goodrich Chemical Company, is now producing glacial acrylic acid at Calvert City, Ky. New unit has capacity of several million pounds a year.

Wyandotte Chemicals Corporation's new propylene oxide plant in Wyandotte, Mich., has attained capacity production. Company now has ample output to market the oxide to other chemical processors. The new plant was constructed as an extension of the ethylene glycol plant at the company's South Works.

Monsanto Chemical Company and Emery Industries, Inc., have started up a 3000 ton/month unit for fractionating crude tall oil, sulfate-pulp-mill byproduct, at Nitro, W. Va. The companies are co-owners of the project. Monsanto is the plant operator.

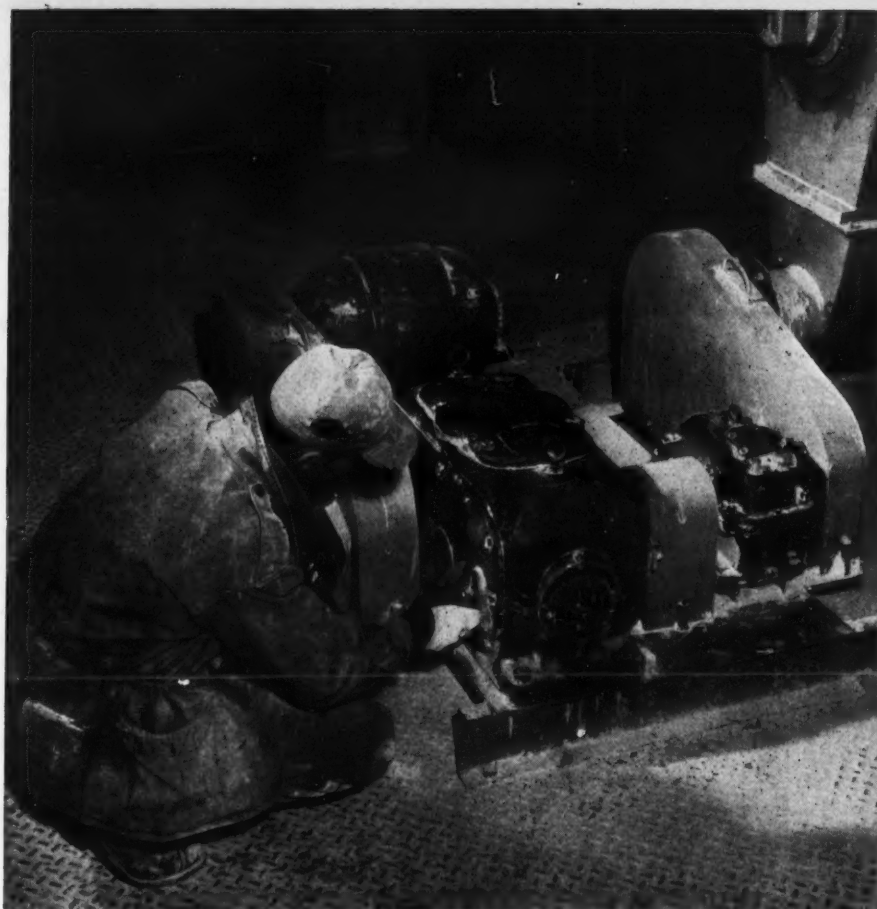
Unit separates crude tall oil, barged from Florida mills of St. Regis Paper Company, into fractionated tall fatty acids for Emery and high-quality tall oil rosin for Monsanto.

Spencer Chemical Company and Industrial Rayon Corporation have joined hands to form the Ohio River Chemical Company for manufacture of caprolactam. The new company will construct and operate a 20-million-pound plant near Ashland, Ky. Initial cost is expected to be approximately \$10 million. Completion is scheduled for early 1960.

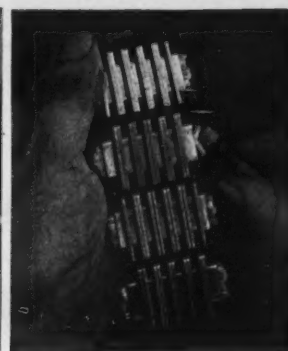
Industrial Rayon now uses caprolactam in manufacture of nylon staple fiber for floor covering and various other textile applications. Spencer uses it to make molding resins, but will sell some of the caprolactam in the open market.

Spencer will be responsible for supervision of engineering, construction, and operation. Plant will use Dutch States Mine process.

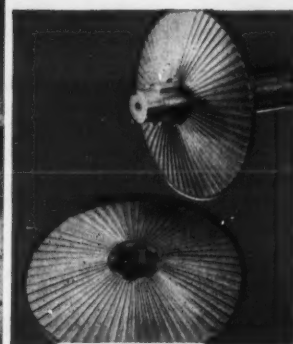
Hercules Powder Company is constructing a pilot plant for production of nitrogen tetroxide in Hercules, Calif. Initial quantities of the oxidizing material will be available in two to three months. Process is new, developed by Hercules.



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nuclear notes

... Significant news about
atomic energy

Magnetic fields vital in fusion research

Magnetic fields are playing a big role in three approaches to thermonuclear fusion. In mirror reactor, studied at University of California, plasma of hydrogen isotopes are brought to high temperatures inside straight tube surrounded by wire coils producing magnetic field in tube.

Extra-strong fields at tube ends reflect stray plasma particles back to central reaction area. While billion degrees C is needed to sustain reaction, mirror system's advantage is high stability of plasma.

In stellerator, developed at Princeton University, magnetic field also is used to confine plasma, but tube is doughnut or pretzel-shaped. Particles are heated to million degrees, then energized further by magnetic pumping — rapid alterations in magnetic field.

Third method is DC or DCX experiment at Oak Ridge. Accelerated molecular ions are fed into magnetic field and broken up into atomic ions by high-vacuum, high-energy electric arc. Aim is to hold atomic ions in reaction area (limited by DC-energized mirror coils) long enough for fusion.

Safety standard published on beta ray sources

Standards handbook has been completed dealing with safe design and use of beta ray sources in industry. Book was prepared under sponsorship of the National Bureau of Standards. The 28-page publication contains a glossary of definitions, and chapters are included on radiation exposure, selection of radioactive materials, prototype testing, instruction manuals, labels, working conditions, and accidents entailing radiation hazards. Several chapters dealing with the handling of sources are also included. There are

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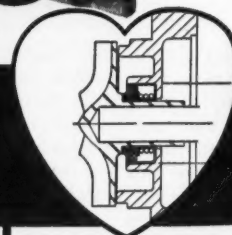
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At last—a full line of pumps specifically designed to handle corrosive and abrasive fluids in the 1 to 80 GPM range, at heads to 70 feet.

No longer need you cut down bigger pumps in range and lose efficiency—or put up with undependable smaller pumps.

Bart pumps have fewer parts to wear or get out of order. 12 models, each in corrosion resistant Type 20 Stainless Steel. Or other alloys on special order.

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Effectively minimizes a long-prevalent basic weakness of centrifugal pump design. Self-adjusting to wear. Needs no external lubrication. Carbon stator with ceramic seat, unexcelled for long wear—or zircon filled Teflon stator with Stellite or Worthite seat for severest corrosive service.

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Check 1533 opposite last page

CHEMICAL PROCESSING



EMIL FISCHER
(1852-1919)

Generally regarded as the greatest organic chemist of his time, Emil Fischer was awarded the Nobel Prize in 1902 for his outstanding researches in the structures of the sugar and purine groups.

By 1902 Foremost's El Dorado Division had completed 10 years of outstanding service to American Industry as a supplier of coconut oil and its by-products... products of outstanding purity and uniformity.

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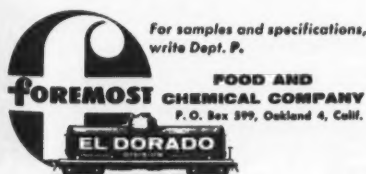
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Caprate Laurate

ESTERS Coconate Myristate
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Check 1534 opposite last page

OCTOBER 1958

NUCLEAR NOTES

two appendixes: A listing of pertinent laws and regulations, and maximum permissible exposure limits.

(Handbook H66, Safe Design and Use of Industrial Beta Ray Sources, is available at 20c a copy from American Standards Association, 70 East 45th Street, New York 17, New York.)

EBWR simulator at Geneva

Simulator of Argonne National Laboratory's Experimental Boiling Water Reactor (EBWR) was exhibited at the Second International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland, in September.



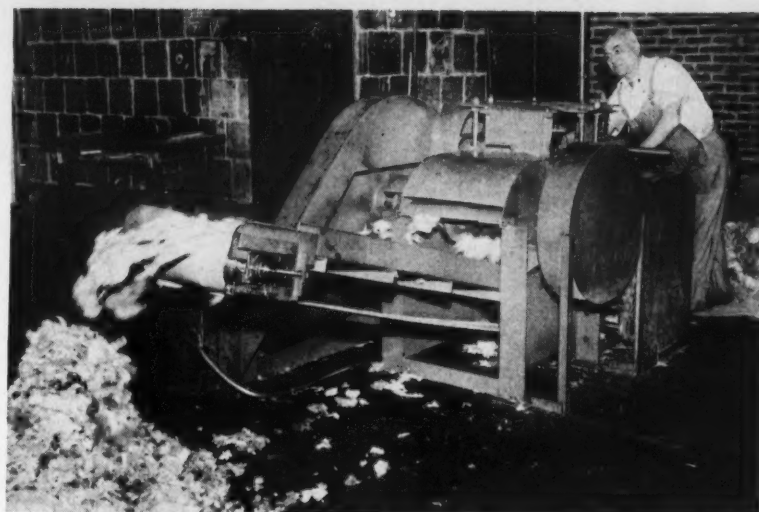
Components weighed more than 11,000 pounds. The simulator, built by Leeds & Northrup of Philadelphia, Pa., shows realistically the mechanisms and principles behind the boiling water reactor. Reactor's core is about half size. Control panels are full size.

Giant atom smasher to have 612 magnet cores

Contract for constructing 612 magnet cores for a 6 billion electron-volt accelerator has been awarded to Eddy-stone Division, of Baldwin-Lima-Hamilton Corporation. The giant atom smasher is being built at Harvard University for joint operation by scientists of MIT and Harvard. Unit will cost about \$6.5 million.

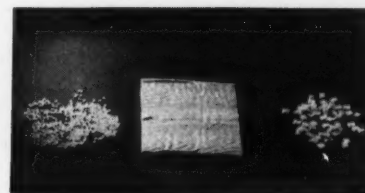
When completed in 1960 it will have a potential energy level 5 to 6 times that of the

To page 23



Cut Your Cutting Costs

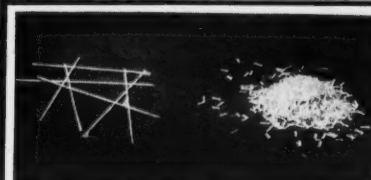
with TAYLOR STILES MACHINES



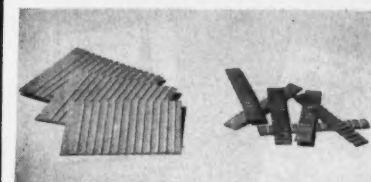
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These fine machines, which operate on the highly efficient shearing principle, turn out more and better work at lower cost. The product is cut cleanly and with remarkable accuracy. Maintenance and power costs are low.

Literally scores of products are being cut on Taylor-Stiles machines. We illustrate here four applications.

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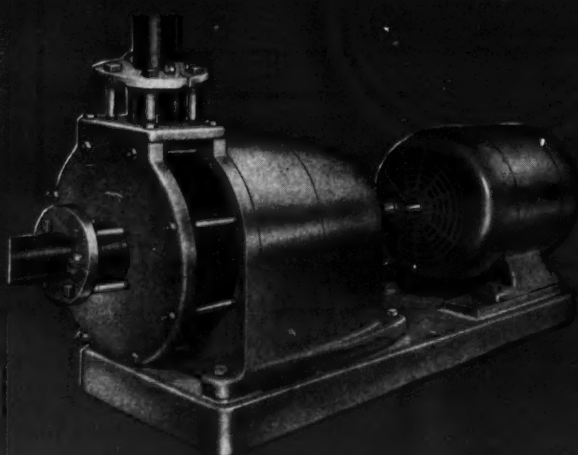
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The secret is in the seal... a self-cooling, self-lubricating carbon-to-carbon rotary seal capable of withstanding temperatures in the 500° F. range. This seal requires no special lubrication, or externally located cooling apparatus which might be contaminated by product leakage. Seal is virtually leak-proof when kept in normal adjustment, and is not attacked by most corrosives.

One user says, "Pump operating continuously for 6 months on 75°C. chlorinated organic acid. Best service ever; no maintenance yet." Another states, "During 3 months, total labor and maintenance has been \$23.00 for 14 Impervite pumps handling hot mixtures of phenol, chlorobenzene, benzene and hot muriatic."

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RUPTURE DISKS made of impervious graphite display some truly amazing properties which save money for processors. Bull. 315.



FIELD SERVICE provides trained men for installation, relocation or repair of any impervious graphite equipment. Bull. 24.



CENTRIFUGAL PUMPS Bull. 854-1.



CORICAL EXCHANGERS require only 1/16" the area as comparable capacity tube and shell design. Bull. 182.

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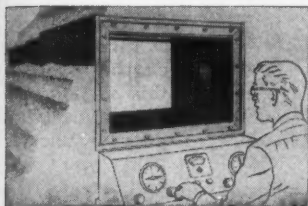
NUCLEAR NOTES

From page 21

largest previous electronic accelerators. Weighing close to 1500 lb apiece, the magnets will be built up from thin laminations (0.014" thick) of high-silicon steel. Total of 460,000 laminations will be required for the 612 cores.

Zinc bromide windows have copper lining

Discoloration of the zinc bromide solution in aquarium-type radiation shielding windows is reported to be prevented by substituting copper in place of conventional vinyl-



Copper liner inside radiation shielding window prevents discoloration of zinc bromide solution

coated steel liner. The windows have passed extensive tests and are now being offered as packaged units. Package includes glass, frame, liner, solution, and installation instruction manual.

(Copper-lined zinc bromide windows are product of Research Equipment Company, 1032 College Ave., Wheaton, Illinois.)

Check 1537 opposite last page.

Army food irradiator to cost \$1.6 million

AEC has signed a contract with Curtiss-Wright Corporation to construct a \$1.6-million gamma irradiation facility as part of US Army's Ionizing Radiation Center at Lathrop, California. Center will be known as the High Intensity Food Irradiator (HI-FI). It is expected to be ready for operation by mid-1960. Source of radiation will be about two million curies of Cobalt-60.

**hydrofluoric acid—to 500° F,
in any concentration
can't corrode Fluoroflex®-T pipe**

liner of Teflon® in thermal equilibrium with housing

Lining is completely inert to all corrosives. It's made of Fluoroflex-T, a high density, *non-porous* compound* of virgin Teflon.

Liner and housing are in thermal equilibrium through an exclusive process developed by Resistoflex. It compensates for thermal expansion differential between the Teflon and the pipe housing, eliminating fatigue collapse, and cracking at the flange.

Reboilers constructed from Type S pipe are now in use handling boiling hydrofluoric acid with complete safety and *no* maintenance problems. Fluoroflex-T Type S piping systems can end maintenance problems for you, too. Bulletin TS-1A gives details. Write Dept. 142 RESISTOFLEX Corporation, Roseland, N. J. *Pat. No. 2,752,697

Ⓔ Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
Ⓔ Teflon is DuPont's trademark for TFE fluorocarbon resins.

RESISTOFLEX

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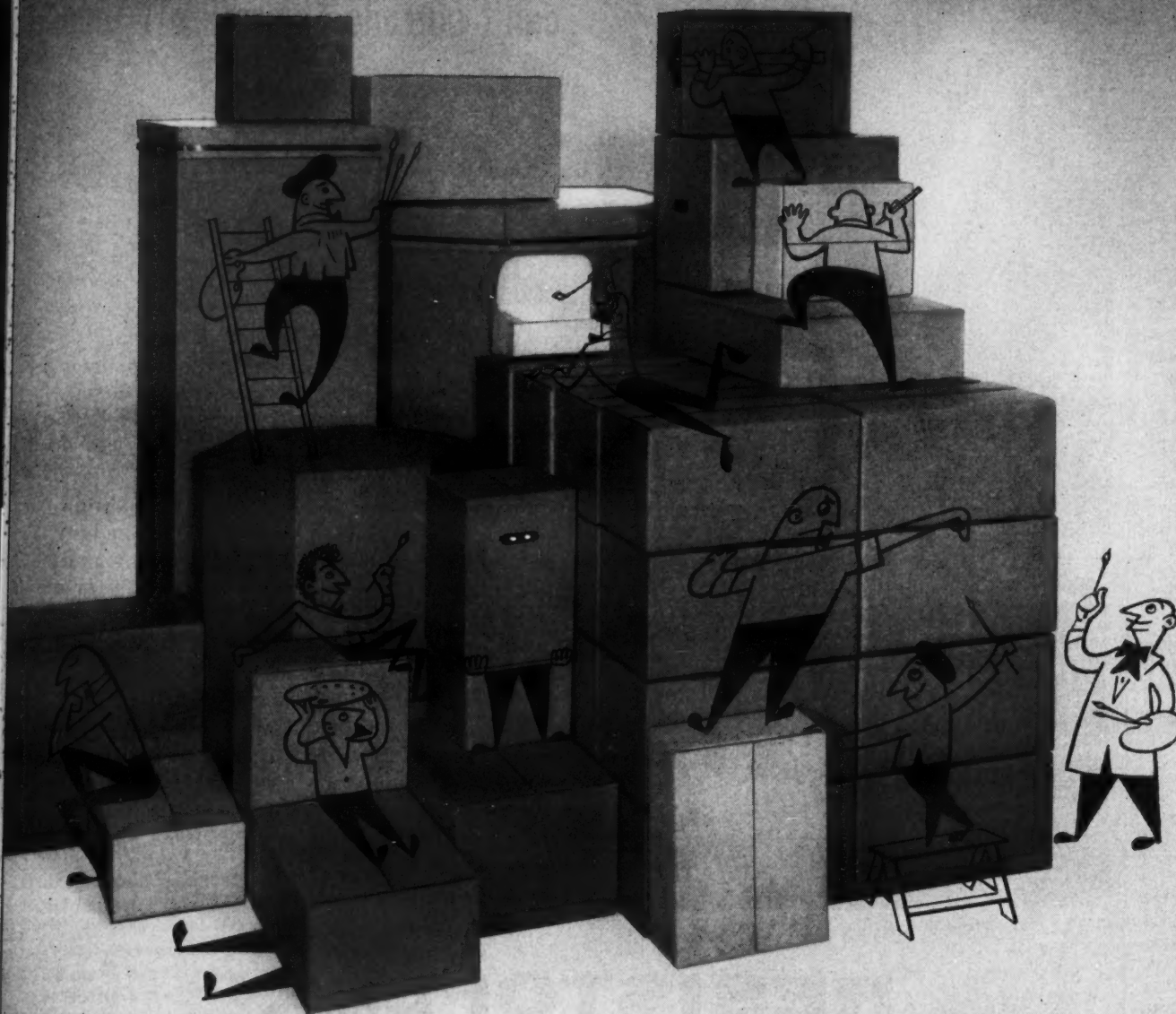
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DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 61.

For more information on product at left, specify 1539 see information request blank opposite last page.



NUCLEAR NOTES

Uranium offered by the ton

Availability of a variety of non-nuclear use uranium products has been announced by Davison Chemical Company. Products available in ton and larger quantities are: sodium and ammonium diuranate, uranyl nitrate, uranium metal, and uranium oxide and tetrafluoride. Announcement follows recent AEC action removing prohibitions on non-nuclear uses of uranium.

(Quotations and data sheets for uranium products may be obtained from Davison Chemical Company, Division of W. R. Grace & Co., Erwin, Tennessee.)

Check 1541 opposite last page.

Remote-handling facility for Atomics International

A \$2-million remote-handling facility for studying radioactive materials from nuclear reactors will be built by Atomics International, a division of North American Aviation, Inc., at its laboratory near Los Angeles. Unit will be one of the most complex installations of its kind in the country. It is scheduled for completion by May 1959.

Nuclear explosions — power and isotopes

Studies to determine practicability of producing both power and radioisotopes from nuclear explosions are being undertaken by the AEC. As a first step, consideration is being given to the detonation of a small device underground in a salt bed area about 25 miles southeast of Carlsbad, New Mexico.

The project, if carried out, would be conducted in the summer of 1959 in a 1200-ft shaft drilled into the salt beds. Heat developed would be confined to a relatively small area. Neutrons created would be used to produce radioisotopes. Planned yield of explosion would be about 10 kilotons. (More on page 104)



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Diamond Chemicals

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Check 1540 opposite last page

OCTOBER 1958

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Dimethylamine-Borane, $(CH_3)_2NH:BH_3$; Trimethylamine-Borane, $(CH_3)_3N:BH_3$; and Pyridine-Borane, $C_5H_5N:BH_3$, are useful for reduction of aldehydes and ketones, for stabilization against color formation, for preparation of Diborane, as polymerization catalysts, and as petroleum additives.

Perhaps other Amine-Boranes would interest you. We can prepare these from secondary and tertiary amines—many primary Amine-Boranes lose hydrogen at room temperature to form amino-boranes. Let us know which complexes you think might be of use to you. For further information on the Amine-Boranes, write for Technical Bulletin C-200.

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Burroughs Wellcome	Johns-Manville	E. R. Squibb
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Literature Available upon Request
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BIG-DIAMETER PLASTIC PIPE?

YES...PLASTIC PIPE

FOR YOUR PLANT UP TO 8"

**IN DIAMETER IS NOW AVAILABLE MADE FROM
A-C POLYETHYLENE PIPE COMPOUND.**

Now your plant can realize the advantages of plastic piping in large-diameter sizes as well as small. Plastic pipe—light, flexible, long lasting—can now be made up to 8" or more in diameter . . . with A-C Polyethylene Pipe Compound, the ultra-high-molecular-weight polyethylene.

More than 200,000 feet of this new pipe are already in use in chemical plants. Reports indicate substantial savings in installation, compared with metal pipe. Projected maintenance costs are phenomenally low. Unlike pipe made from conventional polyethylene, this new piping is completely free of stress cracking, splitting or pinholing. It has exceptional resistance to temperature variation, abrasion and corrosive chemicals.

The great strength of polyethylene pipe makes it ideal for maintenance applications. The smooth bore reduces flow resistance and prevents accumulation of deposits. How strong is it? In a typical test involving sudden surges of pressure, this pipe has withstood surges from 100-300 pounds per square inch for more than 90,000 cycles without failing.

ADVANTAGES of piping made with A-C Polyethylene Pipe Compound

Extraordinary chemical resistance. Withstands acids, alkalies, salts and detergents. Pure and inert for use with potable water.

Long service life. Will not rot, rust or corrode. Impervious to electrolytic environment. Good weather resistance.

Easy installation. Much lighter in weight than metal (about 1/4 the weight of steel). Long lengths readily joined by flanging, welding or Victaulic fittings.

No stress cracking. The only plastic pipe completely free from environmental stress cracking. Impact resistance of pipe compound is 13 ft-lb/in notch.

Surge resistance. Withstands pressures from 100-300 psi for over 90,000 cycles.

Good heat resistance. Greater resistance to temperature variation, hot or cold, than any comparable material.

Low cost. Below that of any metal pipe.

Sample lengths available to those who

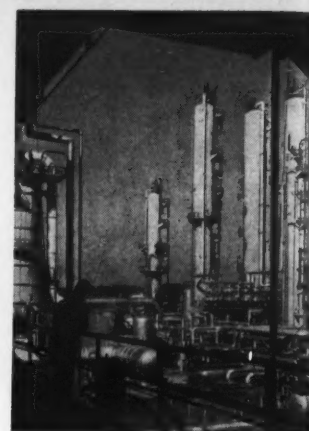
Clip Coupon

to company letterhead.

**SEMET-SOLVAY
PETROCHEMICAL
DIVISION**

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Check 1544 opposite last page



An insight into successful management thinking is shown by steps Petro-Tex Chemical is taking to overcome excess butadiene capacity in

WILLIAM H. DAVIS,
Chemical Sales Manager
Petro-Tex Chemical Corporation
Houston, Texas

OUR company, which was formed only about three years ago, has recently been faced with two formidable problems. The first is to find ways to make full use of a butadiene plant with the butadiene industry 30% over-expanded. The second problem, which is related to the first, is to develop new non-rubber markets for butadiene so that this versatile petrochemical would not be so dependent on rubber industry.

Petro-Tex has taken a number of steps to develop and diversify its operations as have other companies making butadiene. Our program consists of research on uses of butadiene by ourselves and encouragement of such research by others — manufacture of products similar to butadiene in existing facilities or with slight modification — planned production of other products in-



Petro-Tex Chemical plant near Houston represents the largest non-captive supply of butadiene in the world, 200,000 tons per year



Developing and Diversifying a Petrochemical Company

volving capital expenditures for additions to plant — and a look at other hydrocarbons such as polyolefins. Here's how we arrived at decision to take these steps.

When Petro-Tex Chemical Corporation (jointly owned by Food Machinery & Chemical Corporation and Tennessee Gas Transmission Company) was formed in 1955, decisions had to be made quickly. The U. S. Government had decided to get out of the synthetic rubber business and turn the government-owned plants over to private industry.

The market for butadiene and the synthetic rubber made from it was first underestimated and then overestimated. As a result, about 30% of the present butadiene capacity of 1,100,000 tons per year is not needed and will not be needed until 1962. Of the present 750,000 tons of butadiene pro-

duced annually in the United States, only about 35,000 or 40,000 tons goes to non-rubber uses. Hence, the butadiene industry is 95% dependent on synthetic rubber.

When the private industry program started three years ago, the former Sinclair Rubber Co. plant (10 miles south of Houston) was purchased from the Government by Petro-Tex for 23 million dollars. Most of the original butadiene capacity of 70,000 tons per year was contracted to the Goodyear GR-S plant nearby. Operational changes were soon made in the Petro-Tex plant which brought the capacity to 100,000 tons per year. In order to achieve more capacity and still greater operating efficiency and flexibility, Houdry units were then added in 1957 to bring the plant capacity to 200,000 tons per year. Plant investment has been

more than doubled.

Even before it became evident that the butadiene industry was overexpanded, need for diversification was apparent. The Government had produced only enough butadiene to make synthetic rubber. Some butadiene had been going into nylon, resins for shoe soles and heels, paint resins, and organic syntheses, but this butadiene had been supplied by three small privately owned plants.

Petro-Tex is working with the non-rubber users of butadiene, so as to encourage growth of these established end-uses. Some butadiene can be sold to these people and to other new users. Now, what else could be done?

One approach was to undertake research to develop new commercial non-rubber uses for butadiene. Petro-Tex and the other producers did this.

However, research facilities and expenditures of this group were limited. Research of others outside the industry was needed.

Technical Literature

To encourage research by others, Petro-Tex published a technical brochure covering all that could be found about butadiene — its properties, derivatives, and reactions, with a comprehensive bibliography. This 44-page booklet was published in 1957, announced through the industrial chemical press, and sent to research and development people on request. More than 5000 copies have been distributed, indicating wide interest in low-cost olefins available in large quantities. In April 1958 a second printing of booklet was made.

In this way research people around the world are stimulated toward developing new uses for butadiene. Soon after Petro-Tex issued its booklet, another company, Texas-U. S. Butadiene Company, also published a technical booklet on butadiene. Immediate results were not expected from this program, but it undoubtedly will be of great assistance in developing greater

To page 99

It is being said that . . . "right now is the best time in years to build new facilities" . . . general agreement that the "big push" coming in the '60s will easily absorb the additional capacity . . . so

BUILD NOW

for • economy • quality • speed

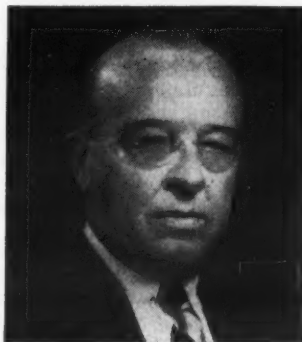
Some of the nation's top builders point up reasons why times are favorable to build now. These builders are in close touch with present building conditions, are qualified to speak with authority.

'Savings of 10-20% over year ago'

T. Ellwood Webster, President, Catalytic Construction Company — In the past few months, the business world has been deluged with the cry that "Now is a good time to build." Industry economists, trade associations, magazines, and even the various and sundry pulse-takers of the economic world have all echoed to the hue and cry that there is a price war being waged in the construction industry. Reports are continually being received of contractors operating below the breakeven point on multi-million-dollar projects.

This sort of report and others

like it have, I think, clouded the picture. They've made it more and more difficult for those planning expansion to separate the facts from fantasy.



T. Ellwood Webster

There is no question about it — "Now IS a good time to build," but not on the strength of rumors of sharp price cutting and of contractors operating at a loss. Doing business on this basis means only dissatisfaction, liens, judgements, faulty workmanship and materials, and a host of other difficulties which the prudent businessman seeks to avoid. No, there are other more substantial facts to support this statement.

First — The good contractor has streamlined his methods and organization so that his own cost of doing the work is reduced. He has arranged better deals with his suppliers and is doing work himself rather than subcontracting it.

Where subcontracting is still necessary or prudent, he looks for similar economies from his subcontractor—and gets them.

Savings of anywhere from 10% to 20% are common over similar costs less than a year ago. We are now constructing a chemical facility which was originally estimated last November at \$1.35 million. The final cost is now estimated to be \$1.25 million, a saving of \$100,000 over a period of only eight months.

Second — All materials and equipment are more readily available today. Motors and controls which required 14 to 18 weeks delivery time a year ago are now in many instances in stock or available within eight weeks at the most.

Structural steel is available from stock; a year ago, six to eight months delivery time was the rule.

What does all this mean to the firm about to build? It means reduction or elimination of expediting and warehousing costs and better pricing. Most of all it means a reduction in the completion time required for a plant — in some cases up to six months. The plant is in operation and earning money that much sooner.

Third — The buyer's market has extended to the financial field. Long-term investment rates are down considerably over a year ago, and financial institutions have begun soliciting loans once more. For the firm which is considering expansion, this means a long-term saving in interest and assures it of the availability of the money necessary for expansion.

In my opinion, the favorable conditions outlined above will not last very long. Military preparations or war are always stimulating to the economy and have an inflationary effect. Actions such as our recent intervention into the Mid-East are likely to touch off delayed or uncertain building programs and thus increase prices. The company that waits for expansion may find that it has waited too long.

'Favorable condition beginning to change'

James Curtis, President, Chemical Construction Corporation — Those companies who contracted to build within the last year are now benefiting in dollars and cents for their faith in the American economy.

We know from specific experience that, thanks to the lower costs of services and equipment, the over-all cost of new plants is running about 6% below what it once was. This means that a client who contracted for a \$4-million plant on a cost-plus basis has saved himself almost a quarter



James Curtis

of a million dollars.

We think there is evidence that this favorable condition is beginning to change. Those contemplating new construction or expansion projects should act quickly so that they may take advantage of the present situation.

'Never find better time for expansion'

A. Thornton Kennedy, President, Davidson-Kennedy Company — It is my firm belief that within the next five years we will see a tremendous expansion due to the explosive growth of our population and the rapid industrialization of the undeveloped areas of the world. This tremendous growth in our economy will, as it has in the past, be tied in with gradual inflation.

It is unfortunate, but it is an economic fact, that with the present recession we in industry are finding that we are constantly having to pay higher prices at no increase in production. For instance, in our area recently, labor demanded and received a package 22c per hour increase from one of our larger concerns, and only recently, major steel producers increased their prices. However, in face of all the inflationary pressures we are able to offer more favorable prices and delivery than we have in past years.

Due to favorable prices received from our suppliers, our over-all prices quoted to our

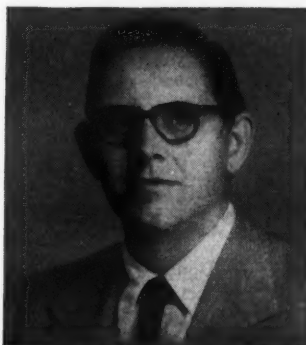
customers today are 5% under those we were able to offer one year ago. Also, costly delays to our customers are avoided, due to the improved delivery dates we received on shipments of steel.

Last year, mill steel shipments to our plant took three months to deliver after placement of orders. Today, the same mills make shipments within 30 days after an order is placed; a savings of over two months on mill shipments.

In addition to getting superior equipment at better prices and more favorable deliveries, the more progressive chemical processing industries are finding that they can borrow money for expansion at more favorable rates than in the past. The prime rates offered by lending institutions are lower today by 1% than they were a year ago.

The conditions existing today that allow industry to expand under these favorable conditions are, I am sure, temporary. Economic pressures, as mentioned above, are sure to eventually necessitate a general increase in equipment and construction costs.

In conclusion, it is my firm



A. Thornton Kennedy

opinion that those in the chemical industry who are progressive and contemplate expansion needs within the next five to seven years will never find a time in which they will be able to carry out the expansion at the advantageous prices they are able to receive today.

'Time cut 20-30%, financing easier'

J. S. Fluor, President, The Fluor Corporation Ltd. — Construction costs at the present time are at least 5% below 1957, even though there have been increases in the construction labor rates.

Materials are being delivered to fabricating shops faster. Because of this, and the shops' lighter work loads, these shops have greatly improved their deliveries and are currently quoting prices lower



J. S. Fluor

than at any time during the last year or two. Because all materials are readily available, the time for completing any given project is reduced 20% to 30%, which of course results in the savings of field erection costs because of the shorter time in the field.

Without question, construction labor productivity has increased 10% to 20% over what it was during the 1955-57 period. When there is a scarcity of jobs, labor productivity always increases.

Financing of new projects is much easier today than at any time during the last two and one-half years. Commercial banks and some insurance companies have funds available at interest rates from 4% to 5%, depending upon size of the loan, length of time the money is required, and of course, the soundness of the borrower.

Another very important factor in lower construction costs

BUILD NOW — *From preceding page*

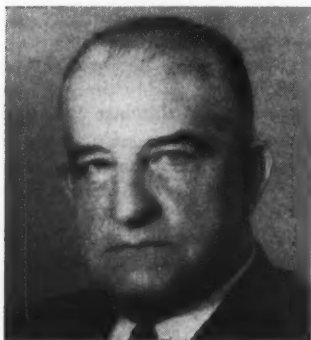
today is that construction labor leaders now recognize and have openly admitted to the unhealthy practices in the construction industry. In January of this year a 10-point code of operating principles was adopted and has been accepted in many areas. This code will eliminate feather-bedding and many other costly practices that have been going on for the past 10 years.

Due to the reduced work load, the employees, both office and field, are much more efficient and more accurate in their work, which greatly helps to reduce costs.

'More-efficient operations'

Admiral Earle W. Mills, Chairman of the Board, Foster Wheeler Corporation — We believe the answer to the question — "Is this the best time in years for chemical companies to step-up their construction of plants and/or plant facilities?" — is a firm "yes" . . . based on these considerations.

1) Over-all costs of construction have tended to level out during the last year — increased material costs have been offset by lower profit margins on equipment and a tendency for better efficiency in labor operations. However, increase in business activity by the end of this year would



Admiral Earle W. Mills

start the ball rolling. Long-term construction projects will probably increase, not decrease, in cost in the future.

2) Materials for construction are generally available at present and will be in the near future. Contractors at this date can plan on material shipments as scheduled. This obviously permits better construction schedules and lower costs. An increase of capital spending, expected in 1959, will tighten up the materials market.

3) In most geographical areas, labor is readily available and contractors can be more selective in recruiting personnel — assuring more efficient operations in the field.

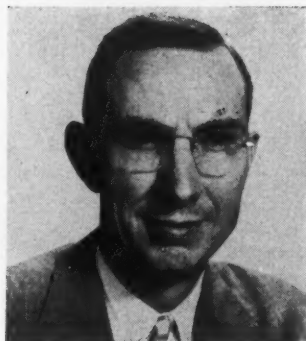
4) Due to the slackening of active projects, engineer-constructors have made the most of the opportunities to tighten their organizations to effect more efficient scheduling and supervision. Necessary reshuffling of personnel has resulted in more efficient staffing of new projects.

5) Finally, wide swings of construction activity have always been costly to the purchaser and contractor. The purchaser now has an opportunity to offset the effects of the next upsurge.

'Strong influences to build now'

T. A. Bedford, Vice President, Kaiser Engineers Division of Henry J. Kaiser Company — In regards to the cost of chemical plant construction we find it very difficult to give numerical answers. There are many factors affecting total cost, and some of them are going up while others are going down.

Materials are more readily available, and it is possible to schedule work more accurately and to avoid extended delays. This, of course, directly affects field costs of contractors, field



T. A. Bedford

labor, and overhead. However, costs of material as such have increased every year for many years and show no sign of being reduced. It is true that certain fringe costs and extra costs are being absorbed by material suppliers which were formerly passed on.

Due to the AFL-CIO Building Trades 10-point program, we have every reason to expect that over-all labor costs will be reduced as the program is carried through. This will have no effect on labor rates but will have a direct effect on over-all labor costs by the reduction of feather-bedding and similar practices and in the better effectiveness of labor.

However, the effectiveness of this program is much greater in some parts of the country than in others and it is not possible at this time to determine what the over-all final effect will be. It also should be noted that in certain parts of the country we are experiencing a significant improvement in labor productivity.

It is quite evident that the money market has altered radically and that the cost of financing has gone down in recent months.

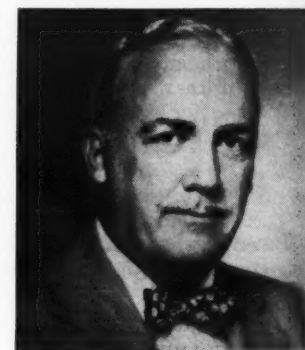
From an over-all standpoint it appears evident that certain favorable factors exist at the present time which should be strong influences to the chemical industry to build now as compared to building later.

The possibility of the over-all costs of material and labor being significantly reduced from present levels appears doubtful whereas the pattern of annual labor rate increases and the over-all inflationary aspects of our economy make it appear that future costs will probably be higher than today's costs.

'Great expansion soon in chemical industry'

William Collins, President, Walter Kidde Constructors, Inc. — Of the estimated \$54 billion spent on research and development through our entire history, almost one-half has been spent in the last five years. A significant portion of this expenditure has come from the chemical processing industries.

This factor alone should point up the fact that chemical companies will be soon en-



William Collins

gaged in one of the greatest expansion programs the industry has ever known. In the chemical industry, perhaps more so than any other, new construction is an extension of the research and development effort. A new or improved process almost inevitably means new or additional construction.

Similarly, the chemical industry is perhaps more "ob-

solescence-prone" than any in our industrial spectrum. Many are the instances where both products and processes have been outmoded almost overnight. Accordingly, most chemical companies — and all those that are successful — are constantly aware of the need to improve both product and facilities. And they are aware, too, of the need to be prepared to meet market shifts caused by new products or new locations for new or existing industries.

Both of these factors indicate the need for continued capital expenditures for new plants and equipment by the chemical processing industries. Arguments are advanced in times like these that, "This is an especially advantageous time to build new plants". Even though this statement contains a good deal of truth, these arguments are, in fact, merely secondary to the fundamental reasoning behind the need for chemical companies to keep their plants up-to-date and growing.

Among the reasons advanced for "buying now" are the following:

1) Better Costs — This is brought about in two ways: There's more competition for equipment orders, and productivity in the field is greater

2) Timing — In the chemical industry there's usually a lag of two years or more between the time a chemical plant goes into engineering and the time it's actually on stream. Two years hence puts us into the 1960s and a new cycle of population growth

Both of these are pertinent reasons. They apply not only to new plant construction but to modernization of existing facilities. The latter is, of course, an area where much can be done to lower the cost of a product or to improve its quality. Paradoxically, it can be done on an advantageous basis, with today's reduced volume of business.

The reason is simply that construction can often be coordinated with production so that plant shutdowns and resulting loss of business can be avoided. This cannot be done when a plant is operating at capacity.

'Three money reasons for building now'

Henry A. Denny, Vice President, Engineering & Construction Division, Koppers Company, Inc. — Some exceptionally good reasons for building now can be given. Money reasons.

1) Highly skilled labor is currently available. Construction costs always soar when contractors have to scrape the bottom of the labor barrel to get a job done. This isn't true now.

2) Construction materials are now plentiful. Jobs can be done more quickly. Competi-



Henry A. Denny

tion among fabricators is keener. The result: lower over-all construction costs.

3) Under present-day conditions, headquarters offices have more supervision, more engineers to put on the job. Result: a better job done more efficiently and therefore at less cost.

These three facts alone can answer the question, "Why Build Now?" Summed up, the answer is "To Save Money."

'Faster completion at lower cost'

J. F. Thornton, President, The Lummus Company — There are certainly excellent reasons for building now. Chemical plant construction can now be handled at approximately 5% less cost than a year and a half ago, due mostly to reductions in the cost of materials.

Delivery of materials is



J. F. Thornton

approximately three to four months faster on the average, resulting in that much faster on-stream time.

Labor is more available in some areas, but no more effective, nor have wages decreased.

Money is definitely more available and can be obtained at about 4% interest. (The best way to finance would, of course, depend upon the individual circumstances of the given company.)

In summary, with the pres-

ing and construction services to the chemical and petrochemical industries, we are obviously interested in encouraging them to build — and to build now. Beyond this, however, we sincerely believe that long-range programs for expansion and modernization should be undertaken now as a well-timed and sound investment.

No one sincerely doubts the fundamental strength of the American economy or questions its growth potential. Future planning by the chemical industry must concern itself with how best to meet tomorrow's demands for products in a dynamic but competitive economy.

Will it cost less to build new facilities today than it did in the past? Possibly so, but not to a large degree. The inflationary trend of wages and prices has shown no signs of reversing. In evaluating a construction program, a most important consideration is, we believe, that tomorrow's plant

Next Month

What do chemical companies say about building now? Do they "go along" with the advantages stressed here by the contracting firms? Top management men in leading chemical companies comment in November CHEMICAL PROCESSING. Look for the article, "We're Building Now!"

ent slackening in new plant construction, the supply of services, materials, equipment, labor, and capital is sufficiently competitive to assure faster completion at lower cost.

Certainly, not building now but waiting for the coming business upswing when plant construction will be heavier and supply facts not so competitive will result in higher costs and longer completion times.

'Tomorrow's plant to cost far more than today's'

Milton Lewis, Executive Vice President, The Ralph M. Parsons Company — As one of the firms providing engineer-

will cost far more to build than it would today.

We are in a buyers' market, with the best qualified suppliers of men, material, and equipment begging for busi-

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Milton Lewis



Management Committee, left to right: Thomas E. Moffitt, R. Lindley Murray, Dr. Earl L. Whitford, Frank W. Dennis, F. Leonard Bryant, R. Wolcott Hooker, Robert E. Wilkin; absent: Thomas F. Willers

HOOKER'S 'NEW LOOK'

JOHN C. VAALER, Editor

When R. Lindley Murray accepted the 1956 Chemical Industry Award "for conspicuous services to applied chemistry" he said "the central, over-riding problem of a growth company is to maintain its status. It must *keep growing* and at a rate significantly above the average." With its latest acquisition of Shea Chemical, Hooker achieves more of that high growth rate.

Growth from a \$40 million sales volume fifteen years ago to today's \$120 million sales did not develop from a management philosophy of "an empire complex" or a desire to "be big." For fifty years the company had grown from within, but to achieve unusual (or more than normal) growth more quickly and thus be in a stronger competitive position, the route via acquisition was the selected course.

Hooker management realized that chemical business was "big league" and needed "brawn and muscle" to offer a strong competitive front. One step to accomplish this was through an aggressive research program. But an adequate research program depends on more sales dollars,

and the quick growth program provided this.

Growth History

For years the company wanted to establish a basic position in the rapidly growing plastics and resin industry. The first step in this direction was the development of the fire-resistant polyester resin, Hetron®, and introduced in 1953. Two years later Durez Plastics and Chemicals Inc., a leading producer of phenolic resins and molding compounds, was acquired. This acquisition, now the Durez Plastics Division and operated autonomously, assured a more rapid development of Hetron resins and gave Hooker a more diversified basic position in plastics and resins.

In the latter part of 1955 the Niagara Alkali Company was also merged with the parent company. With this consolidation, the company realized an ambition to enter the potassium chemicals industry. Immediate proximity of the Niagara plant to the Hooker Niagara Falls plant offered many economies as a result of integration. Further-

more, the availability of additional chlorine without added caustic soda was an advantage. Also it provided a trichlorethylene plant to supply eastern solvent markets and to supplement the production of trichlorethylene at Tacoma.

In November 1956 the Oldbury Electro-Chemical Company was purchased. In addition to the phosphorus and phosphorus compounds available from this new merger, alkali chlorates were added to the list of the company's

products. The Oldbury Niagara plant is also integrated with Hooker's adjacent main plant. The Oldbury Columbus, Mississippi plant provided for geographic diversification in the rapidly growing South.

May 29, 1958 saw the Shea Chemical Corporation consolidated with Hooker, and the new name, Hooker Chemical Corporation, was selected to better reflect the diversity of the product line. After the Oldbury merger, the company had been interested to expand further in the field of phos-



Hooker representatives in top management of HEF, Inc., left to right: F. Leonard Bryant, R. Wolcott Hooker, and Dr. Marion B. Geiger

phorus chemistry. The Shea merger provided additional basic phosphorus capacity at low cost, and in much greater tonnage needed for the manufacture of several growing phosphorus containing compounds.

Further geographic diversification came with the Shea four plants in Columbia, Tennessee; Adams, Massachusetts; Jeffersonville, Indiana; and Dallas, Texas, which are now operated as Hooker's Phosphorus Division. Also with the Shea merger Hooker is now an important factor in the large and expanding sodium tripolyphosphate market and in dicalcium phosphate.

Thus in all the acquisitions above, product lines were added to complement the basic products of the founding company. But just as importantly, additional research, sales, management, and production talent were obtained concurrently. All of which mold into the new Hooker Chemical Corporation with chemical plants at Niagara, Tacoma; Montague, Michigan, and Columbus; Durez Plastics Division plants at North Tonawanda; Kenton, Ohio; and Spokane, Washington; Phosphorus Division plants at Columbia, Adams, Jeffersonville, and Dallas; and the new Canadian subsidiary chlor-alkali plant, Hooker Chemicals Limited, at North Vancouver, B. C.

Emphasis on Research

The research and development program under the direction of Dr. Earl L. Whitford, a Senior Vice President, is a vital activity with a \$3.3 million budget for chemicals and plastics. This program includes general development, patent section, product development, product application, process development and improvement, and pilot plant operations. Research activity is being carried on in the development of organic and in-

organic chemicals as well as plastics derived from Hooker's basic chemicals.

Presently research is being carried on in laboratories at Niagara Falls, New York; LeRoy, New York; North Tonawanda, New York; and Adams, Massachusetts. The new \$3½ million Research Center now under construction on Grand Island will house the main activity of chemical research and some of the plastics and resins research early in 1959.

Research is held in focus for top management by means of the Research and Development Policy Committee consisting of Board Chairman Murray, Dr. Whitford, F. Leonard Bryant, Vice President-Production, and Robert E. Wilkin, a Senior Vice President who formerly headed Sales. This group, which does not administer the program, reviews research activity from time to time to determine policy, examine budget recommendations, and survey targets for present and future activity to determine the course best suited for the company's growth.

Dr. Marion B. Geiger, Hooker Director of General Development, heads up work in long-range growth and diversification programs. Aside from what is developed through Hooker's own research, this may include acquisition of companies, purchase of product, joint ventures, patent and know-how acquisition, new plant location and studies related to upgrading basic Hooker products.

Industry surveys, long-range market research, raw material surveys, studies of competitive companies, foreign and domestic commercial intelligence, and long-range

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Chemical research: Dr. Clarence A. Stiegman, Dr. J. Howard Brown with Donald E. Springer, Chief Engineer, at new Research Center under construction

Checking costs: Frank W. Dennis and Thomas F. Willers



Chemical sales: William L. Gillespie, Robert B. Boyd, John S. Coey, James E. Ferris and Herbert Heesch



Clarifier is 70 ft diam x 15 ft deep, has overflow rate of 1000 gal/sq ft/day



Plant expansion can be a headache in more ways than one. Chemstrand Corporation found themselves faced with an almost insurmountable waste treatment problem when they decided to enlarge their nylon plant. But the system developed through rigorous lab and pilot plant studies resulted in a disposal plant that ...

TREATS NYLON WASTE -- at 30,000 gph rate

E. D. REMY, Quality Control Supervisor
D. T. LAURIA, Sanitary Engineer
The Chemstrand Corporation, Pensacola, Florida

Problem: When Chemstrand Corporation decided to expand its nylon plant at Pensacola, Florida, a few years ago, engineers knew that existing waste treatment facilities would no longer be adequate. Nylon output was to be upped from 50 million to 114 million lb per yr — a boost of almost 130%.

Prior to plant expansion, conventional treatment and control through retention lagoons was sufficient to hold plant effluent within safe river assimilation limits. With plant expansion however, process waste volume would be increased to such an extent that safe assimilation in the nearby Escambia River could no longer be assured. A complete analysis of the situation had to be made and more efficient waste treatment methods had to be instigated.

Almost 90% of waste emanating from plant comes from the manufacture of adipic acid. This is made up of two liquid streams. Stream No. 1, about half of the waste, comes from

the oxidation of cyclohexane, involved in the process. The other half, stream No. 2, is produced in a second oxidation step.

Solution: The first action taken was to determine the exact degree of reduction required to hold treated effluent within minimum safe river assimilation limits. This would then be the true design basis for any new waste treatment plant.

From a statistical analysis of past records, it was found that river flow exceeded 600 cfs 99% of the time. Critical oxygen concentrations occurred during dry summer months, but never went below 5.0 ppm. Since the State of Florida requires that a DO (dissolved oxygen) concentration of 3.5 ppm be maintained at all times, minimum oxygen flow available for the assimilation of organic waste is about 5000 lb per day.

Retention time of Chemstrand waste in the river before emptying into Escambia Bay is less than 1 day, which

CHEMICAL COMPOSITION OF NYLON PLANT WASTES

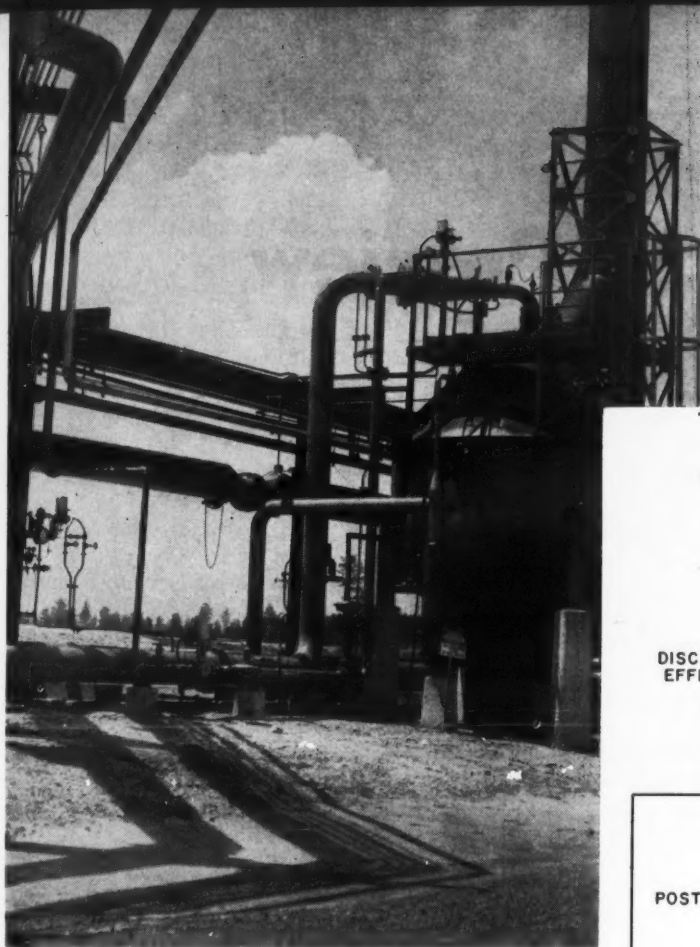
Waste Feed Stock	No. 1		No. 2	
	Max	Min	Max	Min
Constituent (As Percent)				
Cyclohexane Oxidation Products			0.025 (est)	0.025
Succinic	0.005 (est)	0.005 (est)	0.13	0.01
Adipic	0.25 (est)	0.25 (est)	0.0	0.09
Glutaric	0.005 (est)	0.005 (est)	0.35	0.21
Total Organic Acid (as Adipic)			0.89	0.40
Steam Volatile Monobasic Acid (as Acetic)	1.22	0.93	0.47	0.286
NH ₃			0.101	0.095
Nitrogen as Adiponitrile (ADN)			0.009	0.005
Hexamethylene Imine (HMI)			0.017	0.065
Reducible Nitrogen (as HNO ₂)			0.55	0.12
Sulfate			0.2	0.2 (est)
pH	3.5	3.5	1.88	1.9 (est)
Acetone	1.31	0.254		
Methyl Ethyl Ketone	0.56	0.086		
Cyclohexane	30 ppm*	0.0		

* less than 30 ppm

is equivalent to oxidation of about 25% of the 5 day BOD. This means that a maximum of 20,000 lb of BOD₅ may be discharged during critical dry summer periods without hazard.

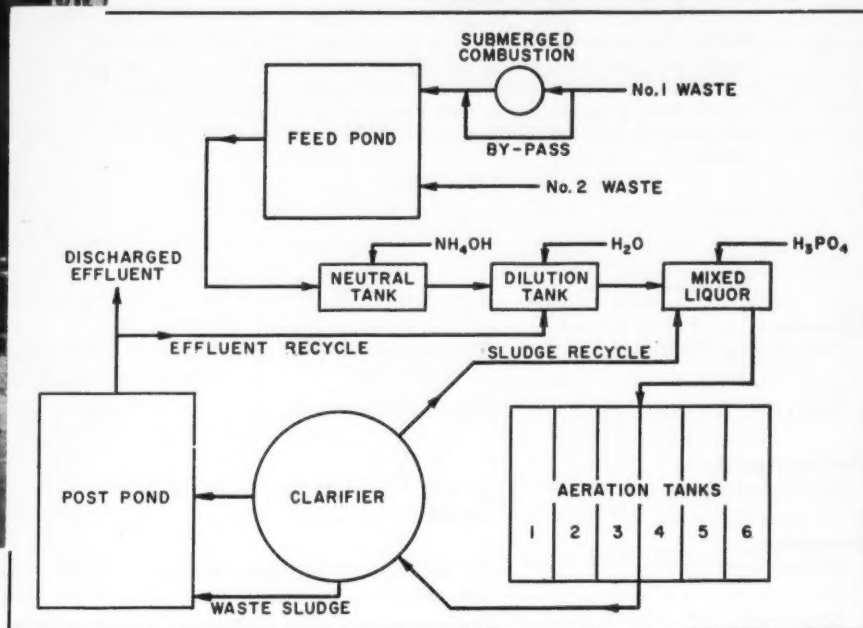
Waste production at expanded manufacturing rates is

set by waste strength and plant production rates and is equal to about 50,000 ppm BOD₅. For design purposes this figure was increased to allow further expansion by a factor of 20%, or to 60,000 ppd. Resulting degree of treatment necessary neglecting effect of



Important phase of nylon plant's waste disposal system is 1600-gal-capacity submerged combustion unit. Equipment can process 125 gal waste per min

Waste treatment plant combines use of several techniques to efficiently process nylon waste



lagoon storage was about 70%.

Once the design basis of the treatment plant was known the next step was selection of the most economical and efficient process that would achieve the desired reduction. Rigorous laboratory and pilot plant studies were started in August 1955 to find the answer.

System finally decided upon consisted of: 1) submerged combustion burner to treat No. 1 waste, 2) large lagoon where equalization of No. 2 waste and submerged combustion effluent would take place, 3) neutralization tank for ammonium hydroxide addition, 4) dilution tank with facilities for both river water and recycled treated effluent waste dilution, 5) mixed liquor tank for addition of phosphor-

ic acid and active recycle sludge with waste, 6) six aeration tanks, 7) circular settling tank, and 8) post treatment lagoon used for effluent flow regulation into river.

Evaporation vessel volume for submerged combustion unit was determined to be 1600 gal from retention time (13 minutes) and maximum flow of No. 1 waste (125 gpm). Natural gas facilities were provided for use of 0.1 scfm per gal, or 160 scfm. Air requirements were sized to provide 10 times that amount.

Ammonium hydroxide for waste neutralization was set at 209,000 ppd (20% aqua ammonia). About 1500 gpm of river water was provided for waste dilution. Recycle sludge flow to mixed liquor tank was calculated as 687 gpm.

Aeration tanks were sized from a consideration of loading (1.2 lb BOD/lb sludge) and aeration tank solids concentration. Solids used for calculation were 2500 ppm rather than 3000 ppm in order to provide added safety factor. Based on BOD concentration of influent raw waste, 1.92 million gal of aeration tank volume was provided in six units. These were sized to provide 10,500 scfm or nearly 2000 scfm per unit. Aeration requirements were increased by factor of 15% for safety purposes.

Clarifier was designed for an overflow rate of 1000 gal/sq ft/day. Based on maximum waste flows, calculated size of this unit was 70 ft diam x 15 ft deep.

Results: Construction started

in March 1957 and the entire waste treatment plant was completed and in operation by October. Capable of handling up to 30,000 gal waste per hr, plant was started up at the optimum conditions determined during pilot plant operation. Bio-oxidation unit was operated at a loading of 1.2 lb BOD/day/lb sludge and with 2500 ppm suspended solids in aeration tanks. Excess air was used to insure sufficient aeration. Submerged combustion unit was operated with waste retention of about 20 minutes.

Plant was run at these conditions for about 3 months to test equipment and determine process efficiency. Volume reduction obtained with burner was about 75% — well over

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Here is your ...

Paint Industries' Show Preview

To help you best utilize your time at the 23rd Paint Industries' Show, Cleveland Public Auditorium, October 6-8, we present here a listing of "new" products and materials that will be on display. In preparing this listing the editors of **CHEMICAL PROCESSING** surveyed the show's list of exhibitors to determine what **brand-new** products or **important** modifications would be introduced, their proposed uses, and outstanding features. Following the listing is a brief compilation of other highpoints among the exhibits.

Product	Uses	Features	Supplier
Closures			
Pail Closing Machine	To close 2½ to 6½ gallon pails automatically.	Production up 1000 units per hour, feeds, closes, ejects.	Bennett Industries, Inc., Peotone, Ill. Booth 98-99
Wide-Lug Cover	For five gallon pails.	Gives 52% more contact when closed, air-tight seal.	Bennett Industries, Inc., Peotone, Ill. Booth 98-99
Curing Agents			
Amino Polyol 798	Curing, flexibilizing agent for epoxies		Olin Mathieson Chemical Corp. New York 16, N. Y. Booth 49
Emulsifiers			
Multi-Purp	Emulsifier, wetting, agent for latex paints.	Gives freeze-thaw stability, simplifies formulating.	Farnow, Inc., Long Island City, N. Y. Booth 105
Witco 912	Anionic-nonionic emulsifier, pigment wetting agent.	For difficult to disperse pigments.	Witco Chemical Co., New York 17, N. Y. Booth 121-122
Witco 918	Anionic emulsifier, pigment disperser for latex paints.	Prevents floating, flooding in alkyd, systems.	Witco Chemical Co., New York 17, N. Y. Booth 121-122
Witco 934 (nonionic) 938 (anionic)	Pigment wetting, dispersion in alkyd paints.	Prevents flooding, floating of organic colors.	Witco Chemical Co., New York 17, N. Y. Booth 121-122
Extenders			
X37 Hydrocarbon Resin	Aerosol paint formulations.	Better leafing in metallics, no-clog spraying.	Velsicol Chemical Corp., Chicago 11, Ill. Booth 120
Micro-Cel Calcium Silicate	Flattening agent, pigment extender.	Superior dry hiding power, lower PVC, uniform flattening.	Johns-Manville Sales Corp., New York 16, N. Y. Booth 111
Fume Control			
Catalytic Fume Combustion Systems	Fume elimination for kettle cooking operations.	Automatic fume destruction, push-button operation.	Catalytic Combustion Corp., Detroit, Mich. Booth 142
Laboratory Reagents			
LAC-1-R-296; LAC-2-446; LAC-3-R-728	Gas chromatography liquid phase.	Separation, identification of long chain fatty acids.	Cambridge Industries Co., Cambridge, Mass. Booth 14
Markers			
Print-A-Can Printer	Printing identification on pails.	One operator handles 500 pails/hr, portable.	Bennett Industries, Inc., Peotone, Ill. Booth 98-99
Mills			
Morehouse Mill, M Series	Grinding, dispersing, emulsifying, disintegrating.	Five-horsepower motor with 5"-diameter ceramic stones.	Morehouse-Cowles, Inc., Los Angeles 65, Calif. Booth 17 & 54
Morehouse Mill, B1400 Series	Grinding, dispersing, emulsifying, disintegrating.	Large production, 30-40 hp, 8" ceramic stones.	Morehouse-Cowles, Inc., Los Angeles 65, Calif. Booth 17 & 54
Three-Roller Mills	Grinding, dispersing paint and other paste materials.	Automatic hydraulic adjustment, single point control.	Chas. Ross & Son Co., Inc., Brooklyn 5, N. Y. Booth 46

Product	Uses	Features	Supplier
Mixers			
Cowles Dissolvers 510-VH	Mixing and dispersing.	High volume, handles differing viscosities.	Morehouse-Cowles, Inc., Los Angeles 65, Calif. Booth 17 & 54
Cowles Dissolvers 20D	Mixing and dispersing.	For mounting on customer's tank, widely adaptable.	Morehouse-Cowles, Inc., Los Angeles 65, Calif. Booth 17 & 54
#130-CDM Double Planetary Can Mixers	Mixing, dispersing heavy paste materials.	Ease of cleanout, handles heaviest materials.	Chas. Ross & Son Co., Inc., Brooklyn 5, N. Y. Booth 46
Kadyszolver Disc Disperser	Mixing, dissolving, dispersing.	Cooled or heated dispersion discs for heat sensitives.	Kinetic Dispersion Corp., Buffalo 16, N. Y. Booth 93-94
Pigments			
M50 Basic Lead Silico Chromate	Metal protective paints.	Permits paints in a variety of colors, rust inhibiting.	National Lead Co., New York 6, N. Y. Booth 21-22
IMPerse Dispersions	Tinting emulsion paints; yellows, greens, reds.	Ease of dispersion, color strength, compatibility.	Imperial Paper & Color Co., Glens Falls, N. Y. Booth 112-113
MD Jewel-Tone Metallics	Decorative and industrial finishing applications.	Cover spectrographic range from copper through gold.	Metals Disintegrating Co., Inc., Elizabeth (B), N. J. Booth 15-16
Kodis Colors N-Line	Coloring all water systems.	Freeze-thaw, alkaline and light stable, compatible.	H. Kohnstamm & Co., Inc., New York 7, N. Y. Booth 116
Kodis Universal Concentrates	Coloring both oil and water paint systems.	Freeze-thaw stable, highly concentrated.	H. Kohnstamm & Co., Inc., New York 7, N. Y. Booth 116
Mercadium Reds Concentrated	Enamels, lacquers for alkali and solvent resistance.	High-concentrated color strength. Low cost.	Imperial Paper & Color Co., Glens Falls, N. Y. Booth 112-113
Non-Leafing Aluminum Pigments	Industrial and automotive finishes.	Improved dispersion, color strength, lack of seeding.	Metal Disintegrating Co., Inc., Elizabeth (B), N. J. Booth 15-16
X-2806 Rex Orange	Exterior industrial product finishes.	Very red, improved light fastness.	Imperial Paper & Color Co., Glens Falls, N. Y. Booth 112-113
Toluidine Red Substitute B1955	Interior and exterior paint formulations.	Easily dispersible, lower cost than toluidine red.	H. Kohnstamm & Co., Inc., New York 7, N. Y. Booth 116
Solvents			
Poly Solv EE Acetate	Solvent for nitrocellulose and acrylic lacquers.		Olin Mathieson Chemical Corp., New York 16, N. Y. Booth 49
Thickeners			
Thixotropic Agent S	Thixotropic agent for gel paints, viscosity modifier.	Ease of dispersion.	Olin Mathieson Chemical Corp., New York 16, N. Y. Booth 49
Vehicles			
Acri-Flo 10 Styrene — Acrylic Latex	Exterior masonry, acoustical tile paints.	UV light and heat stable, excellent water resistance.	General Tire & Rubber Co., Akron 9, Ohio Booth 110
Acri-Flo 151 Styrene-Acrylic Latex	Metal finishes, acoustical tile paints.	UV light, heat stable, high gloss, resists water spot.	General Tire & Rubber Co., Akron 9, Ohio Booth 110
Acryloid B-44 Acrylic Ester 44% Solids in Toluol	Clear pigmented coatings for chrome, metallized parts.	Hard, durable, water-white color retention.	Rohm & Haas Company, Philadelphia, Pa. Booth 140-141
Feon Epoxy Ester	High alkali-resistant coating.	Withstands seven days immersion in 5% caustic.	Farnow, Inc., Long Island City, N. Y. Booth 105
W617 Hydrocarbon Resin Emulsion	Water dispersed film former.	Low cost. Sole film former in white, pastel flat paints.	Velsicol Chemical Corp., Chicago 11, Ill. Booth 120
Hylene Diisocyanates	Urethane vehicles and varnishes.	Solvent resistant, durable, hard, fast drying.	E. I. Du Pont, Wilmington, Delaware Booth 28-29
Hypalon 30	Chlorosulfonated polyethylene paint vehicle.	Chemical and abrasion resistant, durable, flexible.	E. I. Du Pont, Wilmington, Delaware Booth 28-29
Polyco 807 Butadiene Styrene Latex	Latex paints.	Fine particles size offers exceptional pigment binding.	The Borden Chemical Co., New York, N. Y. Booth 137-138
Polyco XP 2447 Butadiene Styrene Latex	Metal primers and gloss finish coats.	Stable in wide formulation range, excellent primer.	The Borden Chemical Co., New York, N. Y. Booth 137-138
Polyco 2755 55% Solids Acrylic Copolymer Emulsion	Water base paint vehicle.	Outstanding color acceptance, flow, and levelling.	The Borden Chemical Co., New York, N. Y. Booth 137-138
Trimellitic Anhydride	Preparation of alkyd resins.	Trifunctionality, high reactivity, new products possible.	Amoco Chemicals Corp., Chicago 90, Ill. Booth 129-130
Uneek	Color dispersing vehicle.	Excellent stability with colors, ease of tinting base.	Farnow, Inc., Long Island City, N. Y. Booth 105
Viton	Paint vehicle.	High temperature, chemical, and oil resistance.	E. I. Du Pont, Wilmington, Delaware Booth 28-29

(See next page for other show highlights)



Inco-Weld "A" Wire helps put an Atomic Reactor together

The installation . . . the world's largest commercial all-atomic power station. It is to be located at Dresden, Illinois.

The Equipment...an 11.5-foot diameter boiling-water reactor pressure vessel of manganese-molybdenum-nickel steel overlaid with $\frac{5}{8}$ -inch of stainless steel. Silver-coated stainless steel tubular rings sit in two square grooves which run around the perimeter of the vessel. During operation, the rings are deformed, forming a tight seal against inside steam pressures.

The fabricator, New York Shipbuilding Corp., Camden, N. J., needed a thin layer of ductile metal over the stainless steel grooves to ensure this tight seal.

MIG welding offered them the

easiest solution. Weld deposits would have to be sound and strong, corrosion-resisting, free from porosity, cracking, and embrittlement. And be machined to 5/1000-inch tolerances.

Their first welds were a miss . . . embrittlement. Then they tried Inco-Weld "A" Wire, the first and only wire developed specifically for welding most dissimilar alloy combinations.

Inco-Weld "A" Wire required no special equipment, no special skills to get weld metal which passed all the tests.

What about your jobs?

This experience shows the high quality of Inco-Weld "A" Wire welds. You can get this same high quality in more than 90% of all

weldable dissimilar alloy combinations.

Inco-Weld "A" Wire is for MIG and TIG welding. If you're set up for metal-arc welding, try Inco-Weld "A" Electrode. It's also good for tight corners and field repairs.

No matter which one you choose or what process you use, you'll get sound and strong, corrosion-resisting welds between 97% of all dissimilar alloy combinations found in the average fabricating shop.

Take advantage of these 2 new Inco welding products . . . write for "Now you can weld dissimilar alloys easily" to get complete information.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street



New York 5, N. Y.

INCO WELDING PRODUCTS

Check 1545 opposite last page

Paint Show Preview

From preceding page

Here are other stops you will find profitable during your tour of the Cleveland Auditorium:

Carbola Chemical Company, Inc. (Booth 63). Superior wet to dry hiding balance obtained using Asbestol and Micro Velva extender pigments in latex paints.

Dow Corning Corporation, (Booth 139). Silicone intermediates for maintenance, decorative finishes; silicone resins for 1000°F paints; and silicone masonry water repellents.

Eastman Chemical Products, Inc. (Booth 57, 58). Weather resistant, clear and pigmented metal lacquers based on half-second butyrate; modifying resin sucrose acetate isobutyrate.

Goodyear Tire & Rubber Co., Chemical Div. (Booth 70-72). Pliolite paint resins in a five panel exhibit demonstrating "The Pliolite Story—A Success Story You Can Share In."

Hercules Powder Company (Booth 108, 109). Ethyl cellulose, nitrocellulose, Parlon film formers; synthetic resins; PE for alkyds; and tall oil fatty acids.

Interchemical Corp., Color & Chemicals Div. (Booth 76). Transparent dispersions of durable pigments such as phthalocyanine blue, green, green gold, midas gold, monastral red.

National Aniline Div., Allied Chemical Corp. (Booth 83, 84). Phthalic, maleic anhydrides, adipic, fumaric acids for alkyd resins; anhydride epoxy curing agents; Nacconate diisocyanates for urethanes.

Pennsylvania Industrial Chemical Corp. (Booth 132). Piccopale emulsions for latex paints; Piccolyte high gloss enamels; aluminum and bronzing vehicles.

Reichhold Chemicals, Inc. (Booth 77-79). Epotuf epoxy resin line including liquid resins, resin solids in solution, and esters; acetate, alkyd, acrylic emulsions.

T. F. Washburn Co. (Booth 13). Burnok thixotropic vehicles for solvent thinned paint formulations.

The chemical industry, perhaps more than any other industrial area, thrives on creativity. And since the first Soviet sputnik was launched, the cries for creativity in scientific thinking have grown to a very noisy level indeed.

Granted, our need for true scientific creativity is greater today than at any other time in our history. But how do we best achieve it; how can chemical management create an environment to foster the best in scientific thinking? Here are . . .

6 Steps to Truly Creative Research

DR. W. GEORGE PARKS, Director
The Gordon Research Conferences

We are now in an age of technological competition — not only between companies, but between nations as well. The idea that Russia, presenting as evidence several sputniks, might have pulled ahead of the United States in scientific research has horrified most Americans. There is now a frenzy of activity in U. S. research circles which rivals the pressure to speed up production during World War II. However, the rules for increasing production of weapons are significantly different from those for increasing the creation of ideas.

Creation of ideas is more like horticulture. If you provide the correct conditions of moisture, heat, light, soil, and other environmental factors, plants will grow — if the seed is all right. Similarly, if you provide the right environmental conditions for researchers, their ideas will grow — if the seed is all right.

Research is a gamble, and you have to be prepared to use as many of the ideas as you can and hope that you come out ahead.

There are steps which you can take to improve your

odds and at least get a larger number of ideas, usable or otherwise. The important factor, of course, is to get the right men and then to put them into the right working environment. Assuming you have some creative types in the research organization, there are some rules you can follow in setting up their jobs. Six points seem to me to be most important. The are:

- Help researchers conquer idea inhibitions
- Keep your laboratory flexible
- Be sure researchers see the broad context into which their work fits
- Keep projects as loose as possible
- Allow time for incubation of ideas
- Make sure researchers are properly rewarded for good work

Inhibitions. Inhibitions have always posed a serious problem in scientific work — sufficiently serious that brainstorming's advocates may be forgiven for thinking that in solving it they had evolved a panacea.

The purpose of the Gordon Research Conferences is to

promote an easy flow of ideas among top scientists in a number of related fields. To ensure this idea flow, and to minimize inhibitions, we have had a long-standing rule: There is no reporting or recording of what is said by anyone at any of the meetings. Therefore, we accomplish, in a psychological sense, the same sort of thing brainstorming is supposed to do — that is, start off the mental processes which lead to creative thinking.

Flexibility. It's important to keep a laboratory flexible both in mood and organization — to permit the interchange of thoughts between researchers of different disciplines. This flow of thinking can be allowed for even in the actual physical planning of the laboratory; facilities can be arranged so as to allow frequent contact between researchers on different projects.

Correspondingly, the staff organization can be designed to keep the laboratory fluid. Many research directors like to reassign men to different projects every year or so, feeling that by the end of that time they have benefited as much as they are going to



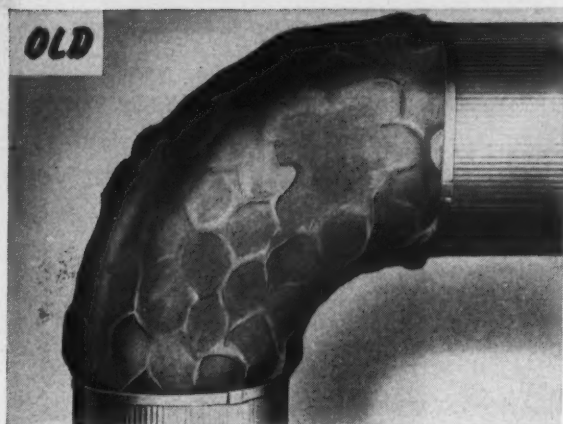
Head of the Chemistry Department at the University of Rhode Island, Dr. W. George Parks is also Chairman of the University Committee on Research. For the past 25 years he has been active in research and development, including catalytic vapor phase oxidation, textile research, fire resistance of textiles, solvent extraction, and organic syntheses. During recent years in which he has been most active in textile research and development, Dr. Parks organized the American Research and Testing Laboratories, Inc., Pawtucket, R. I. and serves as president and director.

Dr. Parks has been Executive Director of the National Academy of Sciences-National Research Council Advisory Board on Quartermaster Research and Development since 1943. Since 1947, he has been the Director of the Gordon Research Conferences at Colby Junior College, New Hampton School, and Kimball Union Academy, in New Hampshire.

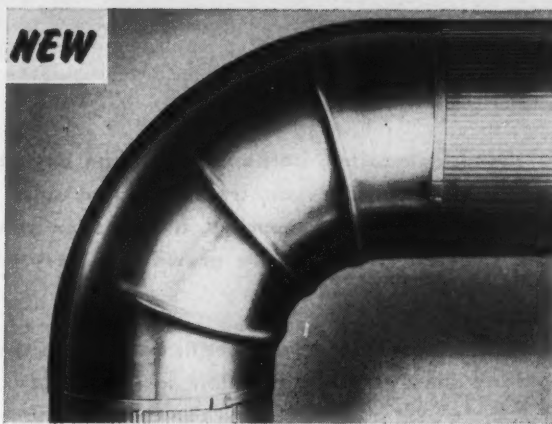
from the personalities and ideas of the people they've been working with, and would profit from some new contacts.

The Broad Picture. All creative scientists — and many lab technicians — like to regard themselves as traveling on one of the main streams of science; they are restless if they feel they are wasting their time on something less significant. At the very least they would like to know that what they are working on has some importance for the company or institution.

Unlimited Projects. Because the creative researcher prefers
To page 238



UGLY, COSTLY CHICKEN WIRE AND MASTIC elbow coverings like this are now obsolete. New Childers Aluminum Ell-Jacs end the need for slow, costly hand-made "patches". Childers Ell-Jacs keep their new look, never need expensive periodic painting or maintenance.



NEW CHILDERS ALUMINUM ELL-JACS now make possible neat, weather-tight aluminum protection from one end to the other of your insulated lines. Childers Ell-Jacs are precision formed for long-radius 90° and 45° ells and have factory-applied moisture barrier.

Childers Announces New Aluminum Elbow Jacketing For Insulated Lines

Revolutionary new Childers Ell-Jacs go on fast and easy . . . fit perfectly . . . cut installation costs . . . never need painting . . . and, used with Childers Jacketing, give your insulated lines that well-dressed look from end to end.

Now, aluminum elbows are made in a wide range of sizes by America's leading manufacturer of aluminum jacketing. Childers Aluminum Ell-Jacs are available for quick, easy application to protect costly elbow insulation.

Childers Ell-Jacs, together with Childers Jacketing, enable you to install maintenance-free aluminum over every square foot of your valuable insulation. You protect *all* of your insulation investment at lowest cost. You get the bonus of a better looking plant and easier housekeeping. Aluminum *keeps* its new look, needs no expensive periodic painting.

Positive weather-proofing, too, is assured by exclusive Childers Lap-Seal (Patents Pending). Factory-attached moisture barrier prevents harm to the underneath side of the aluminum.

First cost is less for Childers Jacketing than for any other permanent type weather-proofing—even less than some temporary coverings.

You also get greater strength and greater protection because Childers

Jacketing is cross-crimped.

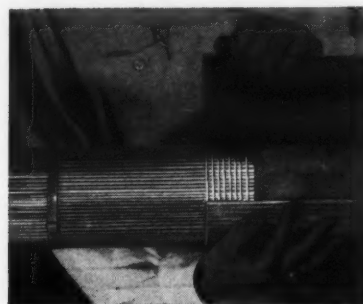
It's easy to install Childers Jacketing. All you need are pliers and screw-driver, plus inexpensive strapping. Two men can do the job. Jacketing can be removed for inspection of the lines, then reapplied without waste.

Why not benefit from Childers world-wide experience when you buy insulation for your lines, towers, vessels, and tanks? More than 2,000 petroleum refining, petro-chemical, and chemical plants will endorse your decision. Childers Engineering Representatives, located in 27 major industrial centers, give professional advice on insulation jacketing.

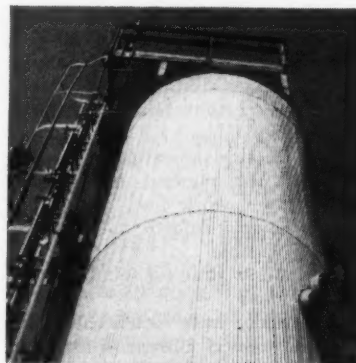
For a free sample of Childers Aluminum Weather-Proof Jacketing, with engineering data on how to safeguard your insulation, write Childers Manufacturing Company, Dept. CP-17, P.O. Box 7467, Houston 8, Texas.

In Canada, write direct to Peerless Mfg. Co., Sub-Post Office 28, Calgary, Alberta.

Only Childers makes available to you complete specifications and engineering data on aluminum jacketing in these catalogs: Sweet's Industrial Construction File pp. 6b/Ch; Chemical Engineering Catalog pp. 530a-d; Refinery Catalog pp. 341-4.



EXCLUSIVE LAP-SEAL, available at no extra cost, is a series of 8 ribs rolled into the underlapping edge of the jacketing, providing automatic measure of the 2" circumferential lap. Proper lap is assured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap-Seal and a mastic.



DEEP CORRUGATED Childers Jacketing in 1¼" and 2½" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels, tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.



Spotlight On People

FREDERICK A. GILBERT is elected vice president of Food Machinery. Gilbert is in charge of FMC's inorganic chemical operations, including company's Becco Chemical Division, Westvaco Chlor-Alkali Division, and Westvaco Mineral Products Division.

As a result of recent merger of Lindsay Chemical Company with American Potash & Chemical Corporation, **GEORGE T. DECK** is appointed vice president and technical director of the renamed Lindsay Chemical Division.

W. ADRIAN KING is named vice president of chemicals division of Olin Mathieson.

Chemstrand Corporation announces several organizational changes . . . **H. C. GREER** becomes vice president and executive director, finance; **R. G. HEMMINGHAUS** is now vice president and executive director, staff services; **C. O. HOYER** is made vice president and general manager, manufacturing and engineering.

RUSSELL F. ERICKSON is elected as Rayonier's new president.

WALTER P. ARNOLD is elected executive vice president of Koppers Company.

News from Atlas Powder . . . **RALPH K. GOTTSHALL** is re-elected president of firm in addition to being elected chairman of the board. And **EDWARD J. GOETT** becomes executive vice president while **EDWARD J. MASSAGLIA** is elected vice president and general manager of newly consolidated chemicals div.

DEAN TYLER assumes new post of manager, foam chemical sales, for Mobay Chemical.

New regional directors for Cyanamid International, unit of American Cyanamid, are **RAYMOND E. LAPEAN**, Europe; **RICHARD C. SCOTT**, Far East; **HENRY W. ROJAS**, northern Latin America; and **JOHN F. GATES**, central and southern Africa.

ROLLAND O. BAUM is elected president of Tennessee Products & Chemical Corporation, succeeding **CARL MCFARLIN Sr.**, named chairman of board.

Check 1546 opposite last page

Three executive appointments at Air Reduction Chemical Company make J. M. TINNON v-p in charge of sales and new product development activities, while R. A. WILSON becomes v-p of production and engineering and DR. G. B. CARPENTER is made director of development for the chemical division, responsible for technical-commercial intelligence in this country and abroad.

CORTEZ P. HACKETT, v-p of Solvay Process Division, becomes director of research and development for Allied Chemical, parent corporation.

Hooker Chemical's board of directors elects FRANK W. DENNIS, DR. EARL L. WHITFORD, and ROBERT E. WILKIN to the position of senior vice president. And JOHN S. COEY is elected vice president, eastern chemical sales.

JOHN E. BIERWIRTH, president of National Distillers and Chemicals Corporation since 1949, is elected chairman of the board. ROY F. COPPEDGE becomes new president of company.

WILLIAM R. HAAS is made director of marketing and NORMAN E. HORTON is new director of sales, both for Monsanto's Overseas Division.

WALTER E. LOBO, former director of chemical engineering division of M. W. Kellogg and partner of Devys & Lobo consulting firm, is maintaining his own chemical engineering office in New York City.

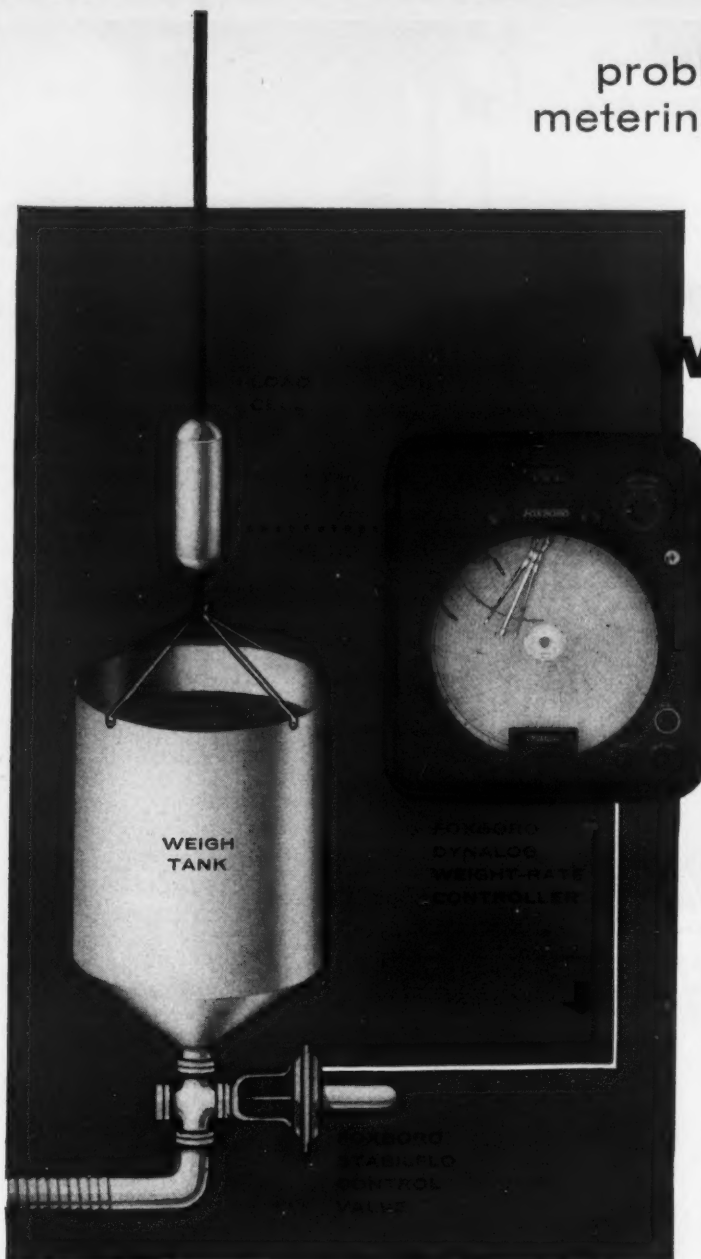


"What's new?"

problem of
metering "tricky" liquids
eliminated!

Foxboro WEIGHT-RATE SYSTEM

accurately controls flow rate
of any liquid that will
pass through a pipe



HOW IT WORKS The Foxboro Weight-Rate Flow Control System controls weight of liquid passing from a weigh tank suspended from a load cell (either hydraulic or strain gauge-type). Cell continuously measures decreasing weight of liquid. Controller records weight, controls time of draining, and sends pneumatic control signal to a Foxboro Stabilflo Valve installed in drain line. After correct amount of liquid is taken from tank in the desired time, controller automatically closes valve.

Here's a Foxboro batch control system designed especially for liquids that undergo wide fluctuations of density or viscosity, or for liquids at high temperatures. Small volumes, corrosive liquids — even liquids that stick to the side of a tank will not affect the system's accuracy.

The Foxboro Weight-Rate System controls flow rate by weight of liquid rather than by volume. Functions of a load cell; a Dynalog* electronic recorder; and a Cyclelog* pneumatic controller are coordinated to do this.

Operation is simple. You merely set weight of liquid, dial the desired time, and push a button. The automatic control system does the rest, while keeping an accurate record of the whole process.

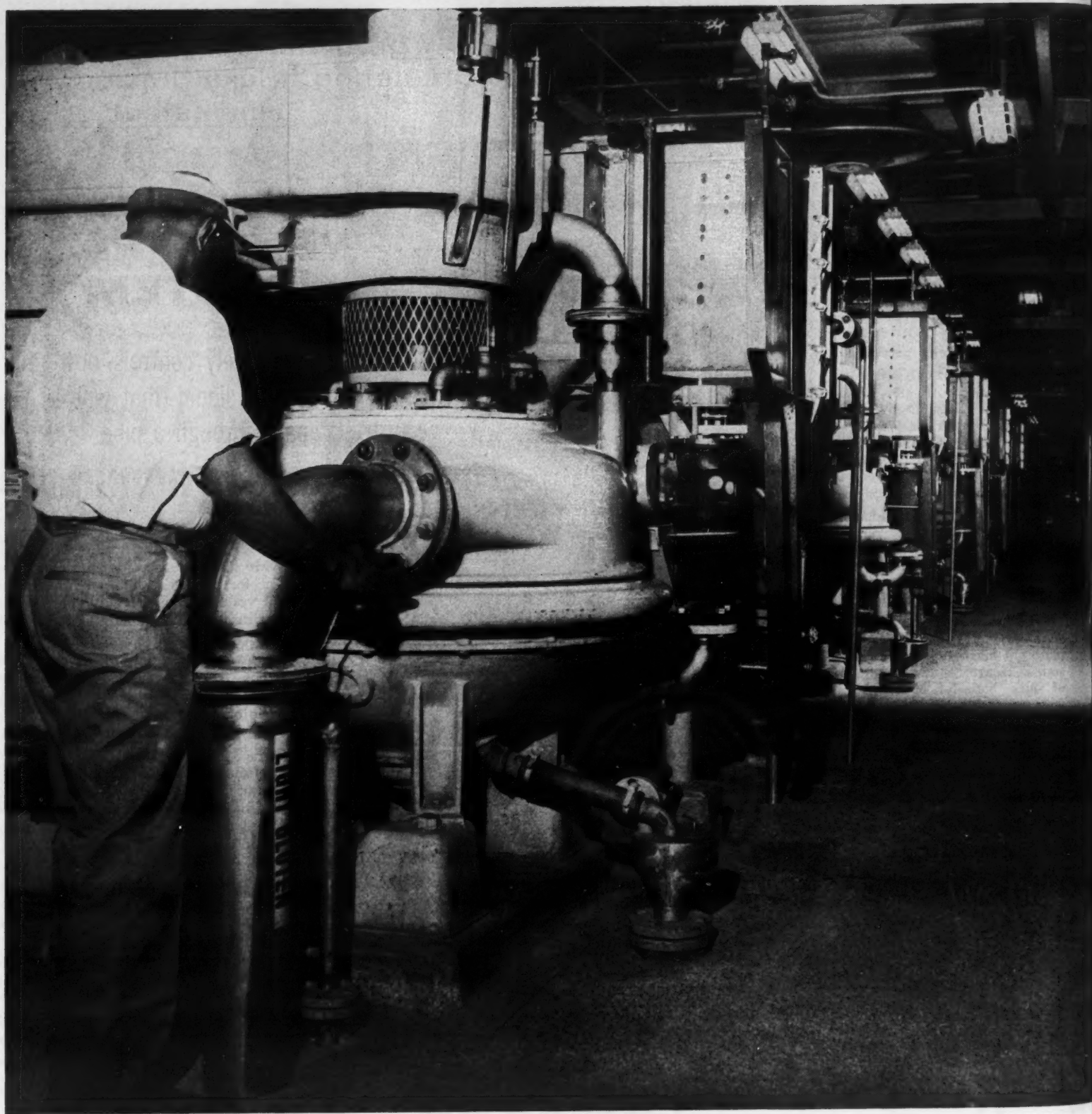
Best of all, the Foxboro Weight-Rate System requires practically no maintenance. That's because neither the measuring element nor the controller ever come in contact with the process liquid.

If batch operations with "tricky" chemicals are your problem, Foxboro has the answer. Call your local Foxboro Field Engineer for full details, or write The Foxboro Company, 8110 Neponset Ave., Foxboro, Mass.

*Reg. U.S. Pat. Off.

FOXBORO FLOW CONTROL SYSTEMS
REG. U.S. PAT. OFF.

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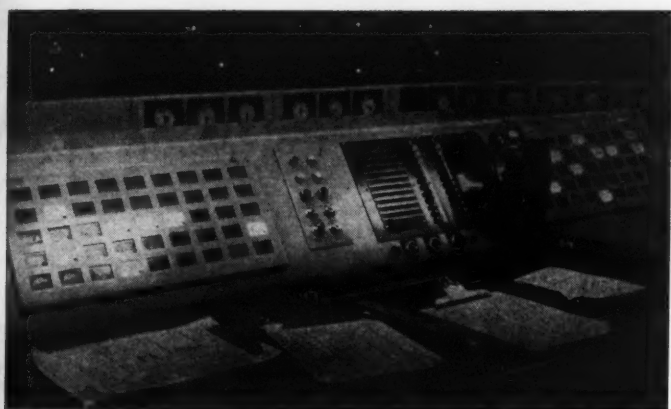
First pass separation of starch and gluten is performed in these centrifuges. Note clean, fume-free working area

C P Staff Photo

Modernization of starch-gluten separation process at Corn Products Refining resulted in an improvement in both product and working conditions. Heart of process is a centrifugal system which provides . . .

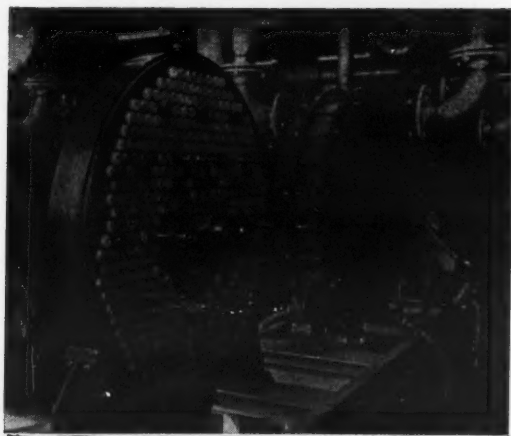
Efficient starch separation with close quality control

THEODORE W. WETT, Associate Editor
with **H. B. FRANEY**, Plant Superintendent
and **WM. S. DOUGHERTY**, Project Engineer
Central Engineering Dept.
Corn Products Refining Company, Argo, Ill.



C P Staff Photo

Control console monitors entire starch separation process. Portion of graphic panel is in background



Hydroclone unit (cylindro-conical classifier) open for inspection. Eight-stage installation reduces protein (gluten) in starch to 0.20%. Small cyclones are nylon

Problem: A desire for improved product quality and process modernization at Corn Products Refining Co.'s Argo, Ill. plant prompted management to an evaluation of starch-gluten separation process. Table house needed to be completely rebuilt or replaced.

High on list of considerations concerning a revision of starch-gluten separation process was requirement for maximum in cleanliness, purity, and control in producing a food product. Also important were employee working conditions. Although greatly improved from early days of the "starch shoveler", major portion of separation process was manually controlled and could not be adequately monitored by supervisory personnel.

In starch production, shelled corn is given a sulfurous acid steep (about 40 hr) to soften kernels and loosen hulls. Softened kernels are then "cracked" in degerminating mills to free oil-bearing fraction which is floated away. Remaining kernel is then fine ground and screened to separate starch and gluten from hulls.

Resulting starch-gluten slurry, called mill starch, contains about 7% protein (gluten) on a dry basis.

Formerly this starch-gluten suspension flowed slowly down long inclined tables. Here

heavier starch granules gradually settled and gluten was carried off lower end. When an appropriate thickness of starch had accumulated (2" to 4"), flow was stopped and starch flushed from tables. Resulting slurry was then filtered, washed, and dried or converted into syrup and starch.

In this separation step, control of process variables such as concentration, temperature, rate of separation, and purity was manual. Six-hour table cycle did not permit close supervision so uniformity was difficult to obtain.

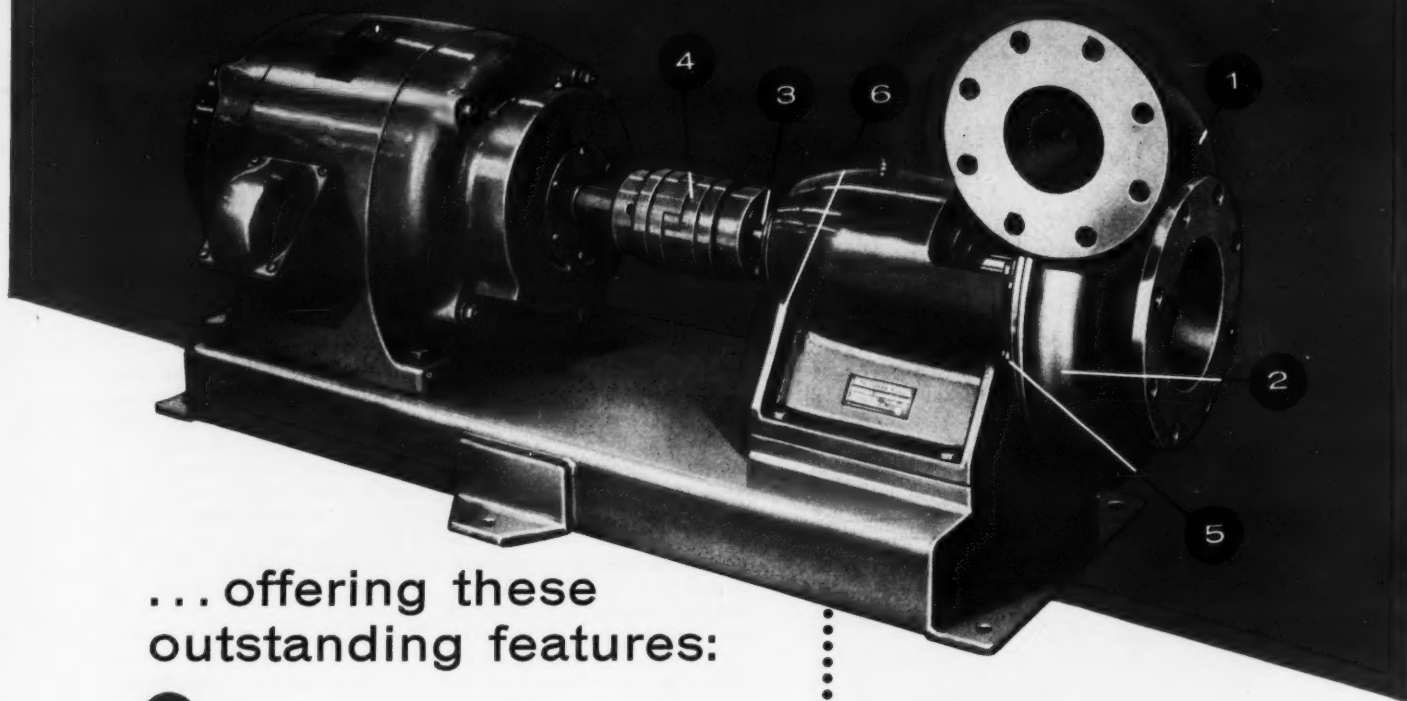
Solution: Earlier work had indicated that application of centrifugal separators to starch-gluten separation was possible and in fact was being successfully used to complement existing table installation. However, existing centrifugal system did not simplify appreciably starch quality control in regard to protein (gluten) content. This system also utilized filters for final starch washing. Other systems were evaluated.

Corn Products Co.'s Research and Development Depts. investigated numerous methods of separation and recommended one utilizing two centrifuges and hydroclones. Central Engineering Dept., using basic data obtained by Re-

To page 45

TRI-CLOVER

presents an *ALL-NEW* series of
INDUSTRIAL Centrifugal PUMPS
 for dependable corrosion-resistant service



... offering these
 outstanding features:

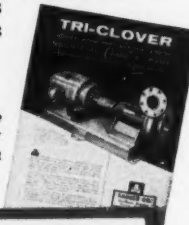
- 1 *Volute type case* . . . specially designed heavy duty pump head gives maximum conversion of velocity to pressure energy, with high efficiency. Pump head swings 360 degrees.
- 2 *"Francis" type impeller* . . . produces lower pressure at shaft sealing surface—minimizes danger of impeller clogging.
- 3 *Precision-machined shafts* . . . minimize possibility of deflection or vibration. Over-sized ball bearings insure long, trouble-free operation.
- 4 *Spacer type coupling* . . . allows removal of complete pump rotary assembly, including impeller and frame, without removal of base or disturbing piping or electrical connections.
- 5 *Exclusive backplate design* . . . accommodates either packing gland or mechanical seal stuffing boxes, which can be easily interchanged in the field.
- 6 *Rigid one-piece frame* . . . of cast iron, has oversized pocket for collecting any leakage from stuffing box, and can be piped to drain away from pump.

For over 35 years, Tri-Clover Division has specialized in the development and manufacture of high quality corrosion-resistant centrifugal pumps. Now, to further extend this pump line, and to meet more highly specialized pumping requirements, Tri-Clover presents an entirely new series of high efficiency centrifugal pumps.

This new series of Industrial Stainless Steel Pumps is offered in a full range of sizes and seal styles, including models to operate at temperatures of minus 80° F to plus 400° F.

SEND FOR BULLETIN

For the full story on these new pumps, write for a copy of the new Pump Bulletin 258-I.



LADISH CO.

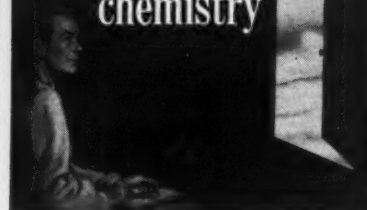
Tri-Clover Division
 Kenosha Wisconsin

TRI-CLOVER

Check 1548 opposite last page

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You might benefit from TRONA's own basic research in these highly reactive compounds, BBr_3 and BCl_3 , versatile as raw materials in the production of elemental boron and boron hydrides, as well as a variety of other uses.

Both compounds have been suggested as polymerization catalysts. BCl_3 has been proposed as a Friedel-Crafts - condensing agent for organic synthesis, as a catalyst in inorganic reactions, and is particularly effective for the control of magnesium metal fires. It has been patented for stabilization of sulfur trioxide.

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Check 1549 opposite last page

OCTOBER 1958

NEW SOLUTIONS

Starch Separation

From page 43

search and Development and some plant operations, designed and installed a completely new processing facility to replace tables and washing filters.

First pass through a high-speed centrifuge, makes initial separation of starch and gluten. Second pass, through a hydroclone or cylindro-conical classification unit (actually a grouping of small liquid cyclone separators), reduces protein (gluten) and solubles in starch to within specified limits.

In primary separating centrifuge, mill starch feed enters top, is brought up to speed, and enters bowl (separating chamber). Gluten-containing liquid is forced, by centrifugal action, up through conical discs into overflow volute. Starch is "settled" out towards periphery of bowl, and is discharged, through a series of nozzles, into underflow volute. Protein in starch is reduced at this station to about 2%.

Nylon Cyclones

Concentrated starch slurry then goes to second-pass, cyclone-type separator-washers. In these units, 480 small nylon cyclone separators each 6" long by 3/4" in diameter are connected in parallel in a single housing. Four parallel housings form a stage. Eight of these stages are connected in series. Water for washing is introduced into the eighth stage and solubles are removed by counter-current wash water flow. Protein concentration is reduced to 0.20%.

Flow rate to each of 13 first-pass machines is 120 to 150 gpm. Total flow from first-pass machines, about 1000 gpm, is handled by 8-stage cyclone units.

Entire separation process, including concentration of light gluten obtained from first-pass machines and middlings (protein-bearing stream) from second-pass units, is monitored and automatically controlled from central panel. A

highly reactive,
white to gray solid,
useful as condensing
agent, reducing agent,
and intermediate
for preparation of
other hydrides—

SODIUM HYDRIDE (NaH)

2

Sodium Hydride, in mineral oil, gives better yields than sodium or sodium alkoxides in a variety of mixed ester and keto-ester condensations, carbethoxylation of ketones, and other reactions. NaH is an excellent drying agent for inert liquids. It can be used for preparation of pure alkoxides.

Sodium Hydride in mineral oil can be handled safely in air without hydrolysis. NaH dissociates completely at 425° (1 atm. H_2). It is insoluble in common solvents; soluble in certain molten salts and metals. Write for Technical Bulletin C-410.

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GALLERY

CHEMICAL COMPANY

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Check 1550 opposite last page

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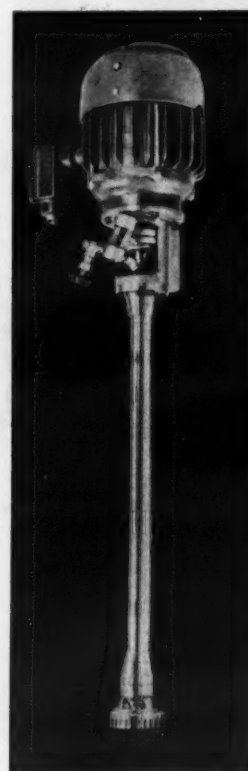
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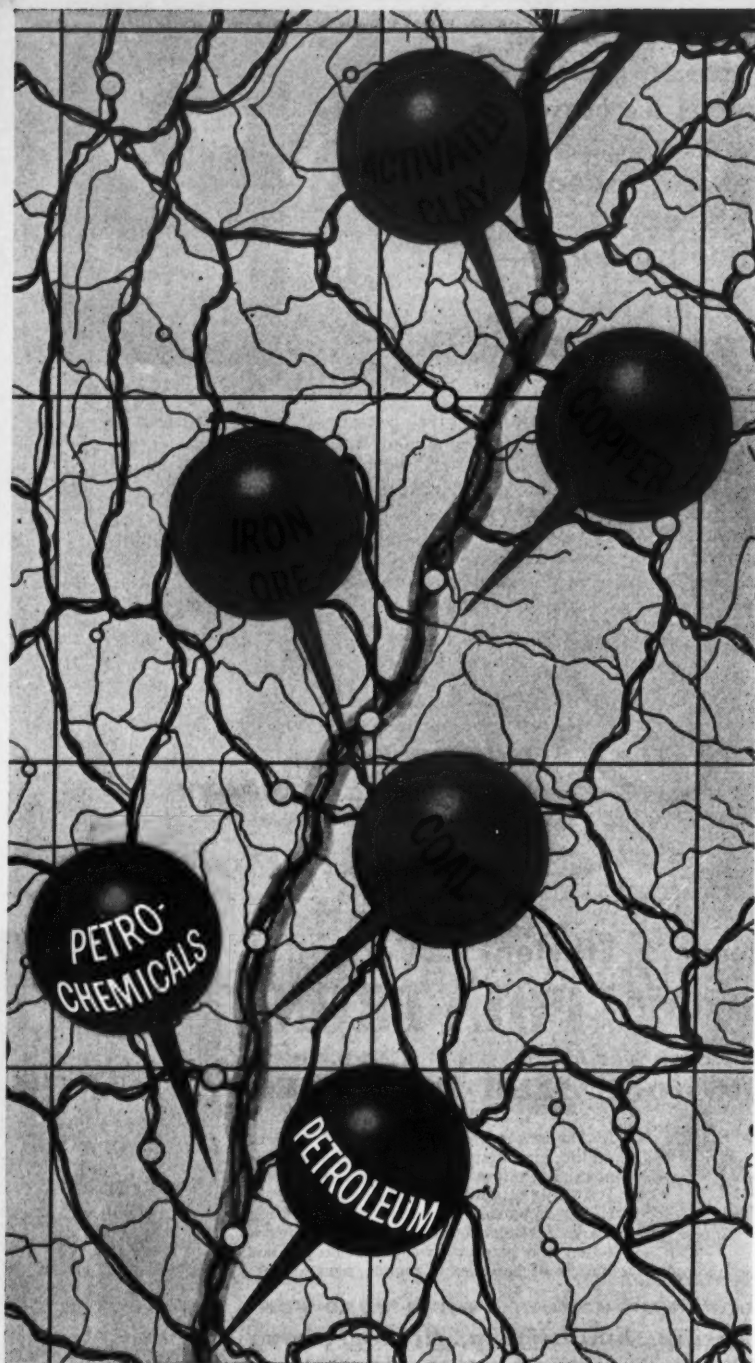
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Check 1551 opposite last page



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 711 Third Avenue, New York 17, N. Y.

Send, without charge or obligation, copy of "Planning the New Plant for Profits."

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CP 10/58



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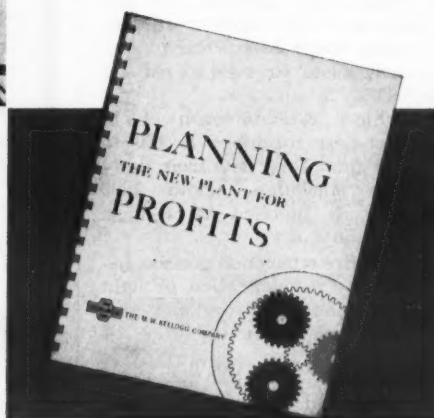
Can Kellogg Give YOU a Lift?

The M. W. Kellogg Company travels far and wide today into the area of engineering and building process plants. Its hydrocarbon route, still the way to successful petrochemical plants the world over, now branches off to numerous other points of interest to management in many industries.

One turn along the way was to the successful synthesis of chemicals from coal—a major South African project and a Kellogg responsibility. Others still further afield, have led to the current U.S. engineering and erection by Kellogg of such diverse facilities as those for the refining of copper . . . the processing of iron ore . . . and the manufacture of activated clay.

If you are planning an excursion to any area where continuous processing is required, most likely Kellogg's broad engineering, procurement, and construction experience can get you there and into production faster, safer, and at less cost.

Kellogg's recent book, "Planning the New Plant for Profits," is fast becoming management's modern guide to the economics of new plant investment. It is available without charge to all who participate in planning or executing capital expenditures. For your copy, please fill out the coupon and attach to your business card or company letterhead.



NEW SOLUTIONS

portion of existing table building was renovated to contain new system and control station.

Results: Complete, automatic control of entire separation and washing process assures uniformity of product. Processing and handling conditions, so important to a food product, are maintained at maximum degree of cleanliness. This step in starch manufacture is now performed in a much smaller area than previously required, freeing premium space in general processing area.

Only a portion of original table building needed to be renovated. This resulted in a considerable saving in labor and materials cost.

Fumes that were inherent in table process have been completely eliminated not only preventing deterioration of building but also greatly improving working conditions. Water balance has been simplified due to elimination of starch-washing filters. Working force has been upgraded and efficiency increased 400%.

(Mercone centrifuge and Dorr-Clone hydroclone units are products of Dorr-Oliver Inc., Havemeyer Lane, Stamford, Conn.)

Check 1553 opposite last page.

Use of stainless steel in the chemical industry is subject of revised 40-page booklet. Included are special sections on process, plastics, and petrochemical industries, detergents manufacturing, nuclear power industry, and others. Comparative table on stainless steels and table on corrosion resistance of stainless steels to various media are provided. "Allegheny Stainless in Chemical Processing" — Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

Check 1554 opposite last page.

NEXT MONTH

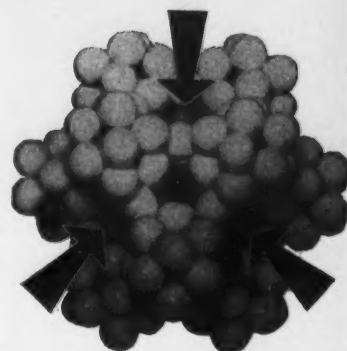
A feature New Solutions article tells how product quality has been improved and production doubled through the use of a stainless steel, water-bed conveyor that cools and flakes resin at Neville Chemical Company.

Check 1552 opposite last page



◀Silicone rubber "on the mill" at Stowe-Woodward Inc. prior to coating rolls. Molecular sieves hold catalyst isolated until cure is desired

Molecular-sieve model indicating several pores opening into single cavity where compounds are "locked" by adsorptive forces



Two new chemical developments join hands with experience at Stowe-Woodward. Result: A successful silicone-rubber-covered plastics-processing roll.

Molecular sieves help fit silicone rubber to tough fabricating role

Problem: Standard rubber-covered rolls used in paper and textile processing and laminating were not suitable for plastics. Hot plastic or adhesive would stick to organic rubber and cause "wrap-arounds" requiring hours of cleaning. Often rubber was gouged, necessitating costly refinishing or replacement.

Stowe-Woodward, Inc., Newton Upper Falls, Mass., suppliers of laminating and processing rolls to paper, textile, and plastics manufacturers and fabricators, evaluated silicone rubber as a roll raw material. Experimental rolls were made up and tested. Although silicones had good heat resistance and release properties, early attempts to obtain a satisfactory roll were unsuccessful.

Solution: Coincident with a concentrated effort on part of Stowe-Woodward Inc. to find an answer to roll problem was commercial marketing of a new type of silicone rubber compound, outstanding for anti-sticking qualities. Compound is particularly effective for thick-section work, has a very low compression set, extreme hardness, and is easily processed. No post cure is

necessary during processing.

Playing a major part in effectiveness of this silicone rubber is the curing catalyst. One of a series of latent curing agents, catalyst consists of di-tertiary-butyl-peroxide "locked" within pore structure of molecular sieves by strong adsorptive forces. Active compound is isolated from formulation until curing temperature is reached (See *CHEMICAL PROCESSING*, June 1958, page 92).

Molecular sieves are crystalline aluminosilicate zeolites. Dehydrated crystals are interlaced with regularly spaced channels of molecular dimensions. Network of uniform pores comprise almost 50% of total volume. Cavities tend to recapture water molecules that have been driven off.

If no water is present sieves will accept any material small enough to pass through pores of the crystal and be adsorbed on interior surfaces. The more polar the molecule, the stronger it is held within the crystal. It is released by application of heat or by displacement with a more strongly adsorbed material, such as water.

In addition to catalyst car-

riers, sieves are used as selective adsorption systems in gas-stream purification (See *CHEMICAL PROCESSING*, July 1958, page 59).

Technical personnel of Stowe-Woodward Inc. and supplier of the rubber worked together to develop proper methods of mixing and calendaring product to fabricate experimental rolls. Success of first rolls led to a long period of production trials and lab

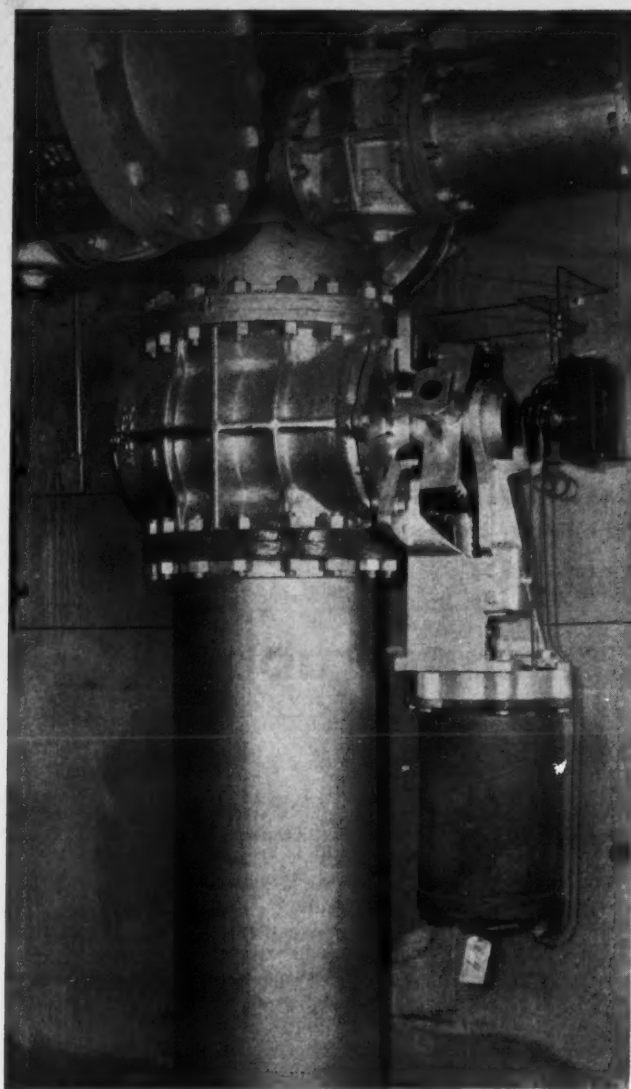
tests. Resulting commercial product, pigmented red, was named "Release" roll.

Results: "Release" rolls have excellent release qualities and can be fabricated without special equipment or unusual processing operations. Both high- and low-temperature characteristics are good.

Rolls have given outstanding performance when used with polyethylene, cured polyester, vinyl, most adhesives,



Distinctive red "Release" roll receiving final inspection. Silicone-rubber cover is hard and exhibits excellent release qualities handling plastics



What do you want in a control valve?

Precise Control?

DeZurik Control Valves have excellent throttling characteristics. They respond instantly, without cycling; they hold positively—without drifting;

Tight Shut-Off?

The rubber-faced plug of a DeZurik Control Valve shuts absolutely tight on any line—even with solids in the flow—without the danger of contaminating the flow with lubricants!

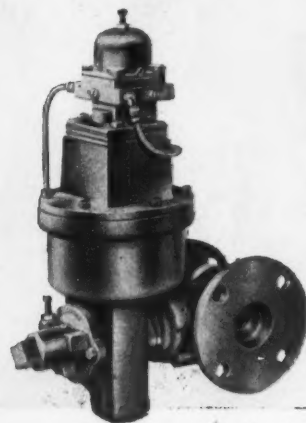
Compact Installation?

The cylinder operator on DeZurik Control Valves is mounted parallel to the pipe—it does not project at right angles to interfere with other installations.

Rugged Construction?

The cast bronze cylinder of DeZurik Control Valves, the stainless steel piston rod, the "O" ring seal on the piston . . . all are designed to deliver longer life with minimum maintenance under any conditions.

And there's more! DeZurik Control Valves with positioners permit cleaner, more simple control console installation; for example, a 1/4" copper air line in place of large hydraulic piping—a single control knob in place of a 4-way valve.



SMALLER DeZURIK CONTROL VALVES are equipped with totally enclosed operators. Their straight-thru flow reduces turbulence and erosion; provision for manual operation is standard . . . and their low, low cost will surprise you!

DeZurik Control Valves are available in sizes through 20" and in a full range of materials. Ask the DeZurik representative in your area for more information, or write

DeZURIK CORPORATION
SARTELL, MINNESOTA

Check 1555 opposite last page

NEW SOLUTIONS

clay, sizes, and natural latex. They are guaranteed and recommended for pressures up to 150-200 pounds per lineal inch.

(Silicone rubber is a product of Silicones Div., Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.)

Check 1556 opposite last page.

(For more information on Molecular Sieves contact Linde Company, Division of Union Carbide Corp., 420 Lexington Avenue, New York 17, New York.)

Check 1557 opposite last page.

Partial operation on concrete . . .

. . . without damaging paved surfaces was one of the reasons for using rubber-tired tractor-shovels at Tri States Minerals Company's plant in Dillon, Wyo. Units handle talc produced for chemical, ceramic, and paper industries.

One of the four-wheel-drive machines loads carriers with raw talc at an outcrop



some 30 miles from processing plant. The other feeds material from stockpiles to processing plant where talc is washed, sorted, pulverized, and bagged.

The two units are equipped with power steering power-shift transmission, planetary final drive, and power transfer differentials. Carrying capacity is 7000 lb; lifting capacity is 11,000 lb.

(Model HH Payloader is manufactured by The Frank G. Hough Company, subsidiary of International Harvester Co., Libertyville, Ill.)

Check 1558 opposite last page.

CHEMICAL PROCESSING



NEW SOLUTIONS of processing problems

Unit containers at Victor's Chicago Heights plant carry up to 3000 lb of phosphates. Note that container is filled on a scale, thus assuring accurate inventory

At double discharge station, two units are emptied simultaneously into variable-speed conveyors



Container and labor costs have been reduced, time savings have been significant, and inventory control is considerably improved in processing of specialty phosphates and chemicals at Victor Chemical Works where . . .

bulk handling system pays for itself within a year

Problem: Rising costs in maintaining product uniformity and quality control on a continuous process involving small lot handling of specialty phosphates and chemicals plagued Victor Chemical Works at their Chicago Heights, Ill., plant.

Drums and lined barrels were used in the quality control operations. Material was stored in these containers while laboratory checks were being made. After quality reports were received, material was then processed.

The fiber drums could be used only a few times, and the 300-lb barrels required liner replacement after one or two uses. Cost of the container and liner replacement, labor costs for transportation of the packages, and labor costs for introduction into the process were rising.

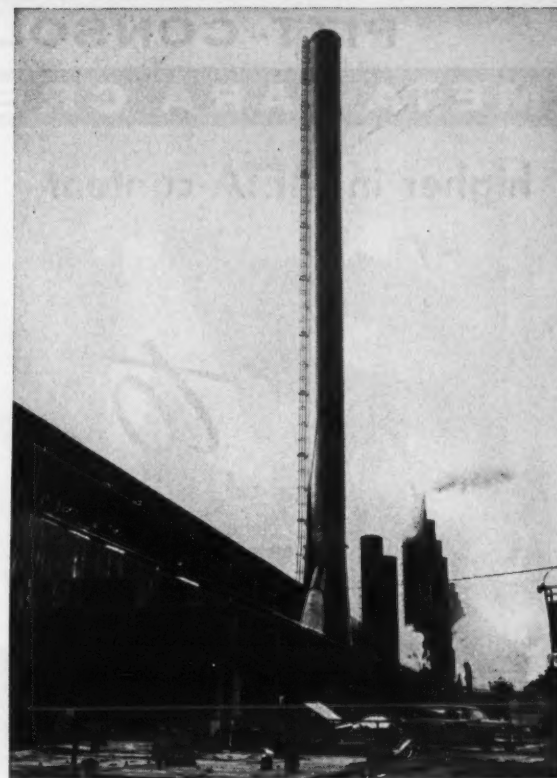
After processing, the procedure was to cool and cure the chemicals in bags. How-

ever, the bags became brittle during cooling and curing, and tore easily. Product moisture was lost to the atmosphere.

Solution: Victor engineers took the problems into consideration and began to study various methods of bulk handling. Large stationary units were considered, but inflexibility and a big capital investment ruled them out.

In order to provide their customers with maximum product uniformity and achieve quality control, Victor decided to install a unit-container system of bulk handling. Hermetically sealed, 74-cubic foot, aluminum containers weighing 225 lb were used to handle phosphates and chemicals.

These containers are capable of handling 3000 to 4000 lb of material. They act as storage units, transportation containers, and discharge hoppers. At Chi-



11' 1" diameter x 250' 0" high, butt welded, self-supporting steel open hearth stack for a leading steel producer.

TALL Against the Sky...

. . . this stack was furnished and fabricated complete including breeching section, in our Youngstown, Ohio, plant. It was shipped knocked down to the job site via rail. There, our construction department took over and erected the stack as shown in record time.

The Youngstown Steel Tank Company maintains a complete stack service including design, fabrication, construction, inspection and repair. We specialize in the steel producing and petro-chemical processing industries.



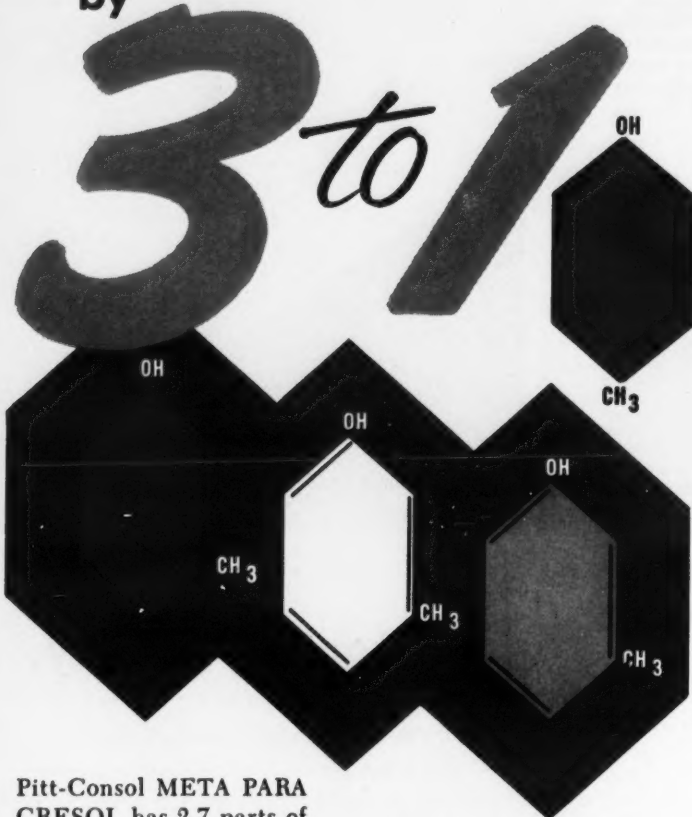
**The YOUNGSTOWN
STEEL TANK
COMPANY**

Youngstown, Ohio

Check 1559 opposite last page

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higher in META content
by



Pitt-Consol META PARA CRESOL has 2.7 parts of meta to every one of para . . . more meta cresol (over 70%) than most mp cresols on the market today! Offered in 2° and 3° grades of high purity and closely controlled uniformity, this phenolic product is unique . . . shows great promise for new phenolic resin applications.

Pitt-Consol META PARA CRESOL is part of a full line of high quality phenols, cresols and cresylic acids produced by our continuous extraction process. Whether you seek high meta content in mp cresols or high quality in any cresylic acid, look to Pitt-Consol first.

*Consult our insert
in Chemical Materials Catalog
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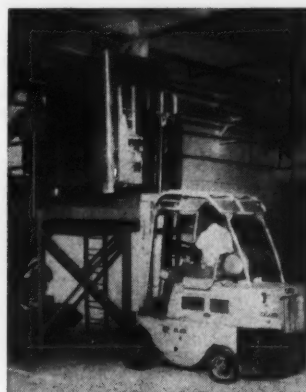
A SUBSIDIARY OF CONSOLIDATION COAL COMPANY



NEW SOLUTIONS

cago Heights plant, these bins have been adapted to carry phosphate in intermediate manufacturing process since mid-1956.

In production operations, material passes through a station comprised of two discharge mechanisms which are an integral part of system.



In this application Victor does not employ the tilt mechanism for discharge. After the bin is placed on the platform, an employee opens the door and phosphates are gravity discharged into the hopper.

These mechanisms convert the large bulk containers into discharge hoppers by tilting them at a 45° angle.

Screw conveyor at bottom of discharge mechanism is driven by variable-speed motor to get desired rate of discharge into bucket elevator. Victor uses a high platform in conjunction with two discharge mechanisms at the Chicago Heights plant. On this platform, bottom discharge is opened, and phosphates cascade into hopper below.

Victor uses bins as shipping containers at its Nashville plant. Flatbed truck transports them between supply and use points.

Results: Although concrete savings figures are not available, Victor says the system paid for itself within a year. It has been able to serve in multiple capacities, adapting itself to whatever job the company has asked it to do. Container costs have been reduced, and labor costs for loading, unloading, storing, and dumping of small lots

To page 52

engineered and designed
by **INFILCO** to meet
most efficiently your
liquid mixing
requirements . . .

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The "VORTI" Mixer by INFILCO achieves the most practical design for the widest range of fluid mixing and blending operations. It is a proven agitator which uses relatively large radial-flow impellers operating at low speeds. Operation is economical and requires minimum maintenance. Hydraulically, the "VORTI" Mixer is a highly efficient, turbine-type rotor, universally applicable to all problems of agitation and mixing for batch or continuous operation.



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Check 1560 opposite last page

Check 1561 opposite last page
CHEMICAL PROCESSING

NEW

REILLY Chemical Index

4th EDITION



The Fourth Edition of the Reilly Chemical Index, just out, is a descriptive list of the chemicals offered by Reilly.

The Fourth Edition presents eighty-one chemicals, of which twelve are new. Because of Reilly's policy to maintain the highest purity possible, twenty additional changes have been made.

You need the new Reilly Chemical Index. Let us send you a copy!



REILLY TAR & CHEMICAL CORPORATION

MERCHANTS BANK BUILDING
INDIANAPOLIS 4, INDIANA

SALES OFFICES IN PRINCIPAL CITIES

Check 1562 opposite last page

NEW SOLUTIONS

Bulk Handling System

From page 50

have been lessened considerably. Time savings have been significant.

Inventory control has been improved also, according to Victor officials. Since all of the bins are tareweighted to the same figure, it is comparatively simple to set up the scale to read net product weight.

By placing one net weight card in the cardholder of the bin and sending another to the office, true running inventory records can be maintained. When a bin is discharged, this cardholder is sent to the office for subtraction from the inventory record. There is no chance for product loss through spillage, contamination, or the like. Besides, stenciling a number of fiber drums is time-consuming and prone to error. A wrong stencil can affect a whole manufacturing process if it is not spotted before the material is dumped.

Save 15-60% Space

As storage containers, the bins may save anywhere from 15 to 60% of storage space, depending upon the warehouse layout and the bulk density of material stored. At Victor, by high-piling the bins, up to a thousand hundred-weights of material are stored in approximately 200 square feet of warehouse space.

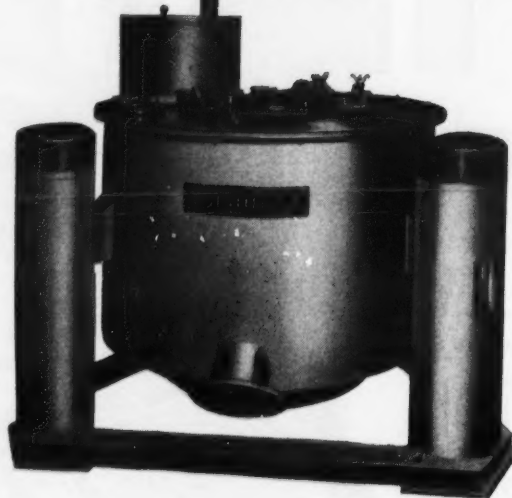
Because of the versatility of the bins, which have been used in a wide variety of duties around the Chicago Heights plant, the company plans diversification. At present, Victor is studying complex formulation possibilities. By the introduction of various components from a number of bins, the end product may be formulated easily. It is done in other plants, and Victor hopes to employ it at the Chicago Heights plant in this manner.

(Tote System of bulk handling is product of Tote System, Incorporated, Beatrice, Nebraska.)

Check 1563 opposite last page.

A complete, integrated service IN LIQUID-SOLIDS SEPARATION

Tolhurst[®] CENTRIFUGALS

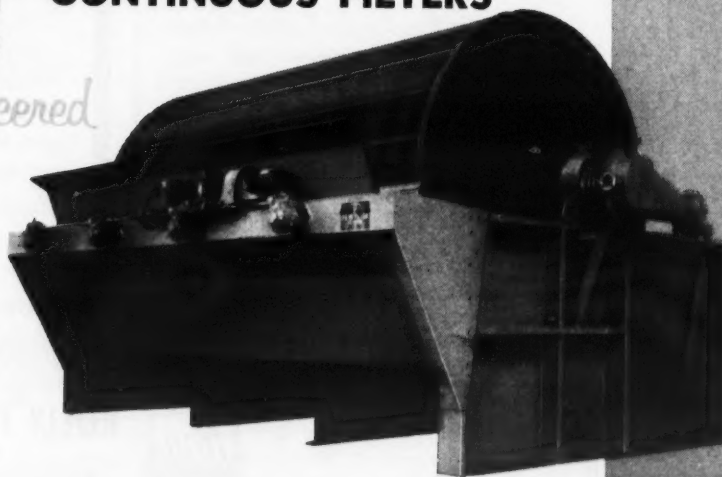


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- * BATCH-MASTER[®]
- * SUSPENDED
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FE INC[®] CONTINUOUS FILTERS

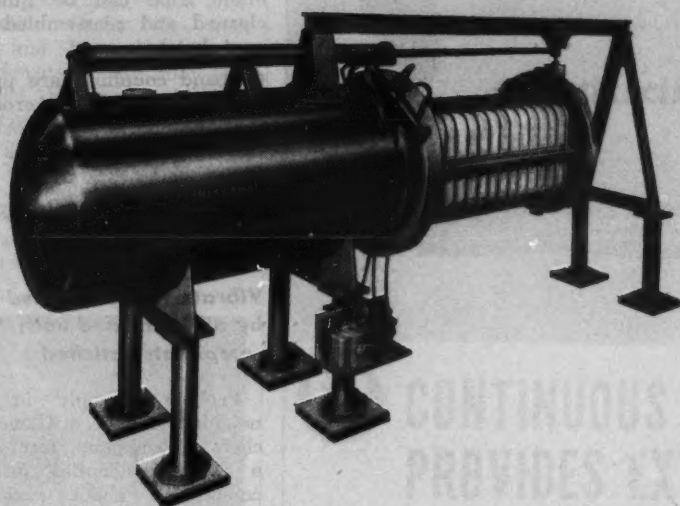
Custom Engineered

- * VACUUM
OR
PRESSURE
ROTARY DRUM
- * HORIZONTAL
TABLE



now offered by *Specialists*

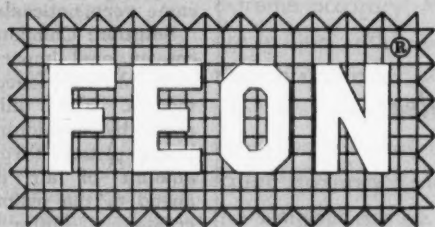
Niagara[®] FILTERS (PRESSURE TYPE)



* **VERTICAL LEAF MODELS** in both horizontal and vertical tank designs.

* **BATCH-MISER[®]** horizontal plate models for polish filtration and batch operations.

* **ALL ASME Code Construction.**



* SYNTHETIC FILTER FABRICS

Available as yard goods or tailored to fit all types of pressure and vacuum filters, centrifuges, dust collectors and other industrial process equipment.

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EAST MOLINE, ILLINOIS

COMPLETE LABORATORY TESTING FACILITIES AT YOUR SERVICE

NEW SOLUTIONS

Pipe cleaning, rerouting for antibiotic processing done quickly

Couplings simplify operation at Eli Lilly

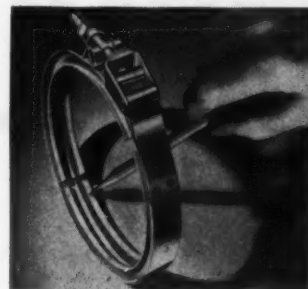
Problem: Connecting and disconnecting vast system of stainless steel pipe is practically a daily operation in



Disconnecting or retightening of coupling is simple operation requiring only a few seconds

antibiotic production at Eli Lilly Company, Indianapolis, Indiana. Even smallest particles from previous batch must be removed from pipe to prevent contamination to next product. Pipe interiors get rigid inspection before reinstallation.

Time element is of major importance — especially in section where penicillin is



Despite constant use, coupling doesn't lose its sealing qualities

purified. Once pipe "knock-down" operation is started on lines feeding filters, it must be finished quickly. Only straight sections of pipe are used so interiors can be easily and quickly examined. No valves or manifolds are used.

Solution: To simplify and

Check 1564 opposite last page



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*Technical data
sheets and samples
available on request.*



METAL & THERMIT Corporation

General Offices: Rahway, New Jersey

METAL & THERMIT—UNITED CHROMIUM OF CANADA, LIMITED • REXDALE, ONT.

NEW SOLUTIONS

speed up pipe cleaning and rerouting operation, special quick-disconnect couplings were installed. Disconnecting or retightening of couplings is a simple one-man operation requiring only a few seconds. Coupling aligns and seals itself automatically. Even with constant reuse, unit does not lose its sealing qualities.

Results: Use of couplings speeds operations considerably. Downtime is cut to minimum. Pipe can be quickly cleaned and reassembled for next batch.

(V-band couplings are product of Marman Div., Aeroquip Corporation, 11214 Exposition Boulevard, Los Angeles 64, California.)

Check 1566 opposite last page.

Vibrator noise reduced by air-cushioned unit; complaints satisfied

Problem: People in the neighborhood of a Cleveland chemical company, located in a semi-residential district, complained about excessive vibrator noise during Sunday morning operations. Company had four vibrators on bins located on top of their building. On Sunday mornings when traffic noises were at a low level, vibrator noise became very noticeable.

Solution: Company replaced conventional impact vibrators with air-cushioned vibrator models. The unit reduces noise by cushioning the vibrator piston's thrust. A small amount of air is released ahead of the piston. This air creates a buffer as piston moves back and forth, cutting noise to minimum.

Results: The air-cushioned vibrators have reduced noise level extensively. Residents in area are satisfied and company has been able to continue its seven-day week operations without creating further ill will.

(Air-cushioned vibrators are products of The Cleveland Vibrator Company, 2828 Clinton Ave., Cleveland 13, Ohio.)

Check 1567 opposite last page.

Check 1565 opposite last page

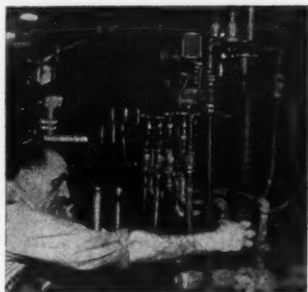
NEW SOLUTIONS

Maintenance, repair costs in steam-line service drastically reduced

Problem: Globe valve, installed on a steam line at the General Electric plant in Schenectady, N. Y., must be opened and closed six times every day. Service is so severe that valves failed every two weeks, on the average. Maintenance and repair doubled, often tripled valve cost.

Solution: Globe valve with body and bonnet made of high-density bronze alloy was installed. Seats and discs of the valve are made of tough, service-proven, corrosion- and wear-resistant alloy, called Brinalloy.

After installation of valve in troublesome line, tests lasting more than a year were



Cause of trouble at General Electric plant was valve on 3/4" steam line leading to plastic curing steam table

made. Valve was taken off at four-month intervals and its seat and disc were examined under a microscope.

Results: There were no failures, no leakage, and no signs of wear. Estimated to have paid for itself more than 50 times over in maintenance savings, valve is still giving dependable service in the line. Considerable savings have also been made through eliminating leakage of air, steam, and water. Since the test, many other valves of this type have been installed on crucial applications in plant.

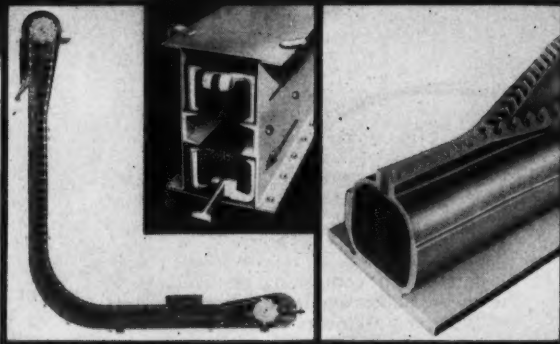
(LQ600 valve is product of The Lunkenheimer Company, Beekman & Waverly Sts., Cincinnati 14, Ohio.)

Check 1568 opposite last page.



SA CONTINUOUS WEIGHER PROVIDES EXTREME ACCURACY!

The STEPHENS-ADAMSON Continuous Weigher weighs material continuously while in motion with extreme accuracy. Material entrance and exit points are in line with pivot axis of weigher providing for easy installation within existent processing operations and completely eliminating all discharge terminal errors. The unit handles hot material with equal accuracy. Minimum headroom is required. The weigher can be adapted with control equipment for accurate gravimetric feeding without requiring extensive plant alterations. STEPHENS-ADAMSON engineers will be happy to work with you on automating your processing operations.

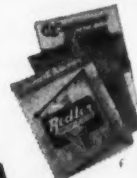


S-A REDLER CONVEYOR

Skeleton flights, linked together and moving through totally enclosed casings, induce the mass movement of powdered, granular or flaky bulk materials in any direction. Gentle conveying action and sealed casings mean maximum protection for materials handled. Redler units combined with Continuous Weigher offer automatic operation.

S-A ZIPPER CONVEYOR

Literally a moving, material-carrying conduct, the zipper closed belt, conveyor-elevator is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Bulk materials are conveyed free of breakage, agitation or segregation within the sealed and dusttight belt. The zipper combined with Continuous Weigher is ideal for automatic feeding operations.



Write for the following bulletin:
Continuous Weigher Bulletin 958
Redler Conveyor Bulletin 556
Zipper Conveyor Bulletin 349

Sales and Engineering Offices in
All Principal Cities

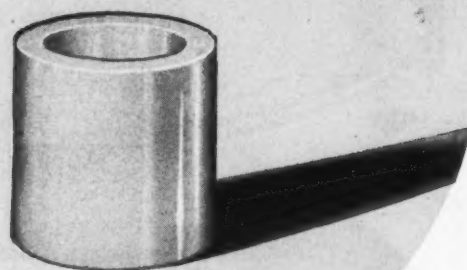
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MFG. CO.

Check 1569 opposite last page

What makes a good porcelain Raschig Ring?



Do you have these Engineering Data?

As part of our continuing research, U. S. Stoneware makes available a wealth of data helpful to all engineers concerned with the design and operation of Packed Towers. With the exception of the 232 page book—"Tower Packings and Packed Tower Design"—the bulletins are free on request.

- ☐ Bulletin S29-R. Complete data on the performance of Intalox Saddle Packing.
- ☐ Bulletin TP-54. Data on all packings of our manufacture, including Raschig Rings and metal Pall Rings.
- ☐ Bulletin TA-30. How to select and install Support Plates and Distributors.
- ☐ Bulletin HDP-56. The use and function of Hold-down Plates.
- ☐ Tower Packings and Packed Tower Design. 232 page text book, written by Max Leva, and published by The U. S. Stoneware Co. It is available in a cloth binding for \$8.50 per copy, and in a special paper bound edition for students at \$3.50 per copy.

Address literature requests to
Engineering Dept.
The U. S. Stoneware Co.
Akron 9, Ohio

A porcelain Raschig Ring is really nothing more than a piece of ceramic tubing whose length is generally the same as its o.d.

Most porcelain Raschig Rings look much alike. But there is a whale of a difference in the way they perform, and the way they stand up in service.

What makes a good porcelain Raschig Ring? And how can you tell?

Physical examination will tell you a lot. Check a number of pieces taken at random from a commercial shipment. (Hand picked samples can mislead you!) Are they uniformly round? Or is there a high percentage of oval rings? Flattened rings will reduce tower efficiency. Check wall thickness. Rings with extra heavy walls (a result of die wear) cut down on column free space, hurt tower performance.

Make comparative lab tests on porosity. Check weight loss from acid attack. Load bearing tests will indicate crushing strength. In making these checks you will be duplicating the routine tests we make on all ceramic rings of our manufacture.

How can you be sure of getting good porcelain Raschig Rings? There are many tests you can make to compare values. But the simplest way to be sure is to buy "U. S. Stoneware."



U. S. STONWARE
AKRON 9, OHIO

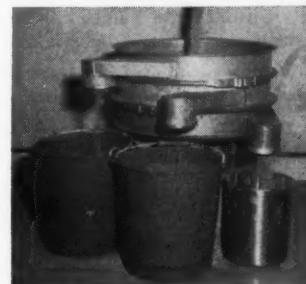
NEW SOLUTIONS

Accurate screening done on abrasive corrosives by 18" separator

Unit easy to clean; screen cloths changed quickly

Problem: Laboratories of American Potash & Chemical Corporation are called on to make exploratory studies on various materials that are highly abrasive and corrosive in nature. Data must be gathered from these tests to be applied to full plant scale. Versatile screening device that gives rapid, accurate results under these conditions was needed.

Solution: An 18" diameter vibrating-screen separator was



Vibrating screen separator used for test purposes has given trouble-free operation in the handling of abrasive and corrosive materials

installed. Several screen cloths (8 to 60 mesh) were obtained for various needs.

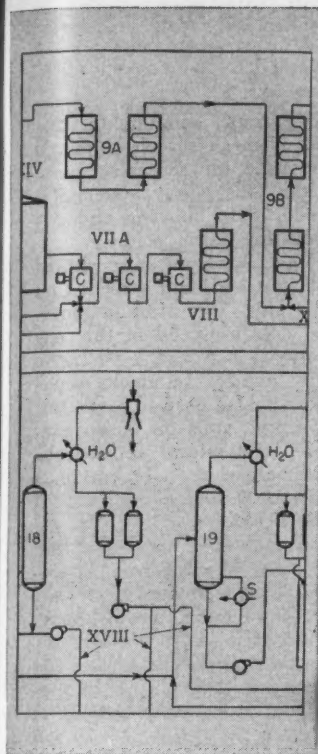
Separator was first used in connection with test runs of mixed alkali metal carbonate. Mixture consists of potassium carbonate, rubidium carbonate, cesium carbonate, and lithium carbonate.

In the manufacturing process, an end liquor is evaporated by spraying onto a bed of recycled anhydrous mixed carbonate material. This forms hydrates which are introduced into a rotary dryer and recalcined.

Agglomerated solids from dryer are screened on separator where -20 and +40 mesh end product is removed. The +20 oversize is discharged, crushed, and mixed with -40 fines and returned to hydrator for reprocessing.

To page 58

Check 1570 opposite last page



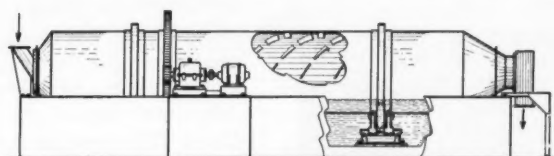
Large chemical process equipment

designed and built by Dravo's experienced team of engineers and production men, can often mean large dollar savings to your company. Dravo's know-how in custom-built equipment can help you reduce costs through use of large, efficient processing units.

Find out how this service can add dividends to your processing equipment investment. Contact Process Equipment Department, Dravo Corporation, Pittsburgh 25, Pa.

DRAVO
CORPORATION

Check 1571 opposite last page



Ruggles-Coles ROTARY COOLERS ... in four types

- **Gas-Cooled Type** — Solids are cooled by direct contact with cooling air (atmospheric, or dried and refrigerated). Inert gases may be used in a closed system.
- **Water-Cooled Shell** — Water is externally applied to the shell, either by sprays or by partially submerging the shell, (as illustrated above).
- **Tubular Type** — Internal water-cooling tubes are assembled with the rotating shell, or installed as a stationary bank of tubes concentric with the shell. Alternately, the water leaving either of these tube sections may be used for supplemental spray cooling on the shell exterior.
- **Direct-Contact Water** — For rapid cooling from very high temperatures, water is sprayed directly on the hot material to utilize the latent heat of vaporization. Usually supplemented by secondary air cooling.

Each of these types has a particular area in which it is most economically applied. Write for further information.

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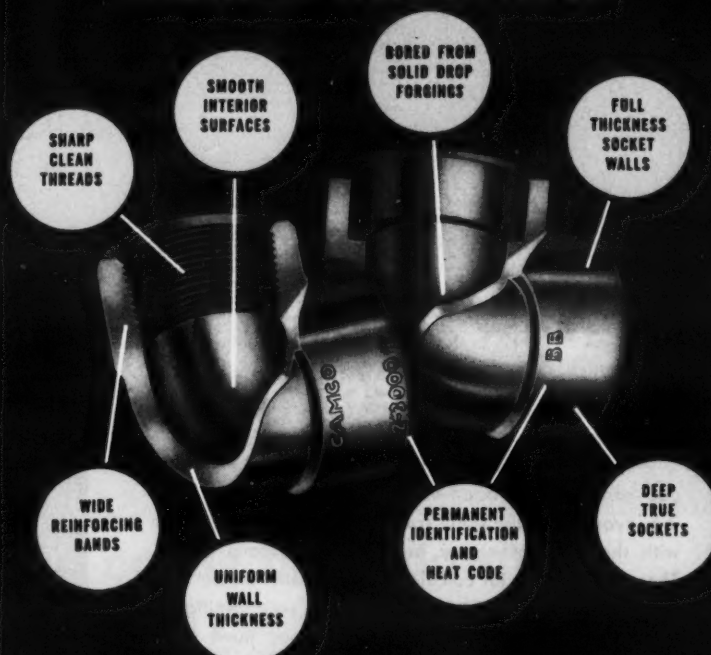
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Check 1572 opposite last page

OCTOBER 1958

SPECIFY **CAMCO** THE *Quality* LINE IN FITTINGS

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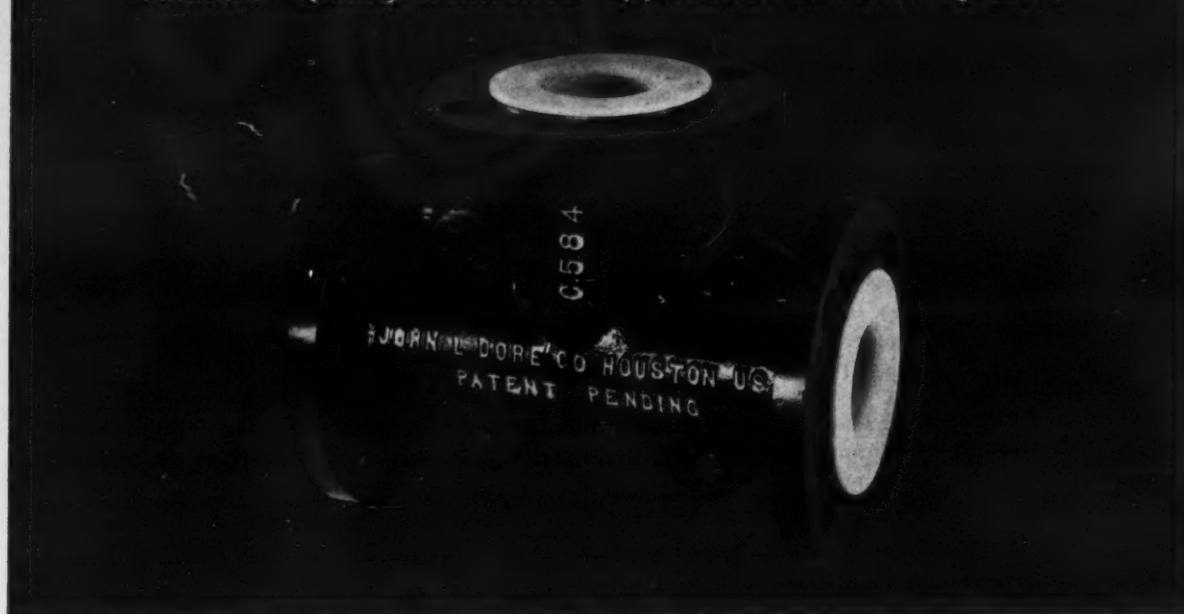
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Check 1573 opposite last page

Another "Quality Controlled" application of Teflon by Doré

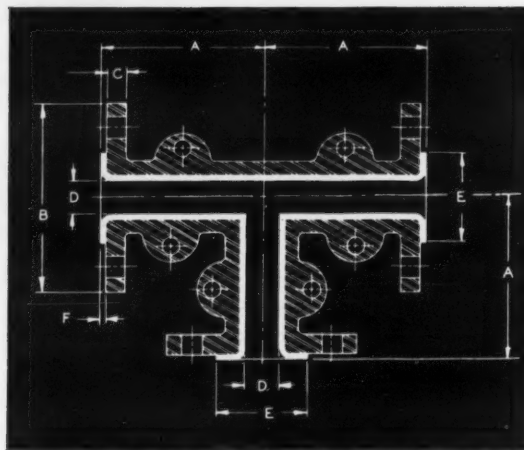


DORE' TEES LINED WITH TEFLON* Have Standard** Face to C/L Dimensions.

This exclusive feature of Doré Teflon lined Tees means you can plan corrosion-free, contamination-proof piping layouts with the same specifications and install them with the same efficiency as you do standard piping. There are no special calculations required . . . no "off-size" fittings to complicate and upset your piping installation schedule. And only Doré Tees have these standard dimensions.

Doré Tees are lined with pure, white Teflon, 1/8" thick. The Teflon lining is tough, dense, hole-free. IT HAS NO WELDS. The Teflon lining, including the flange face seals, are molded in one piece. The seal covering the raised face of the flange is perfectly flat and smooth . . . not wavy. Flanges make up leakproof without the use of an extra flange gasket.

Doré engineered and "quality controlled" Teflon lined pipe and fittings can be the solution to corrosion and contamination problems. Write for bulletin K-57-A, giving us information about special problems you have.



Face to C/L dimensions ("A") are in accordance with ASA 125# Cast Iron Flange Fittings standards. Tees are ductile iron with flanges drilled to ASA 125# standards. Pressure Rating: 400 psi, Vacuum Rating: Full, Temperature Rating: -90°F to 500°F.

*Du Pont's registered Trademark for fluorocarbon resins, including tetrafluoroethylene resins.

**ASA 125# Cast Iron Flanged Fittings.

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SALES ENGINEERS
FOR JOHN L. DORE, INC.

DU PONT'S TEFLON
HI-QUALITY NYLON

NEW SOLUTIONS

From page 56

Separator, employing 20- and 60-mesh screen cloths, is also used for screening boric oxide. This glassy material is produced by melting and dehydrating boric acid.

Melt is passed over chilled roll, crushed, and screened on separator. Two sizes of material are produced in this operation, -20 and -60 mesh.

In addition to above, separator is also used to make test screening runs on boron carbide, potassium tetraborate, and potassium pentaborate.

Results: Since its installation a few years ago, the vibrating screen separator has provided trouble-free operation. Unit is very easy to clean. Screen cloths are quickly changed to meet any screening need. Screen cloth life has been very good.

Even though unit is small in size, capacity is high and screening results are accurate. Engineers report that after test runs using the 18" separator, they know exactly what can be expected on full-scale production operation.

(Vibrating screen separator is product of Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 58, Calif.)

Check 1575 opposite last page.

Over 200 times more wear given by centrifuge bags in chemical plant

Acrylic fiber material stops production bottleneck

Problem: Inability of conventional cloth centrifuge bags to give satisfactory service caused serious production bottleneck at National Polychemicals, Inc., Wilmington, Mass. The firm, which produces specialty organic chemicals for rubber, plastics, and related industries, uses the bags in its centrifugal extractors to hold chemicals during spin-drying.

Rotation speed of centrifugals is 1100 rpm. Operating cycle is 14 minutes. Many times, the bags would not even last a single cycle. Each break in the bag meant loss of solids and liquids, neces-

Check 1574 opposite last page

NEW SOLUTIONS

sitating recovering and recycling the material through the dewatering process, which doubled time of operation.

Centrifugals have 30" perforated bowls and are 18" deep. When placed in the extractor, bags are filled with about 75 lb of wet material.

Solution: Dynel bags, woven of Union Carbide Corporation's acrylic fiber, were substituted for the conventional cloth bags. Fabric is resistant to harsh chemicals, acids and



Bags are used on 30" centrifugals. Each bag holds about 75 lb of wet material

alkalis, has high wet strength, and can withstand tough treatment. Its rigidity permits bags to be inserted into centrifuges without danger of overlapping folds developing during use.

Results: After a five-month test period, it was found that the Dynel material consistently lasted an average of 200 cycles per bag — as compared to one or two cycles for the conventional cloth bags. Furthermore, with a little stitching when minor tears or splits developed, the new bags could be made to last as long as 300 cycles.

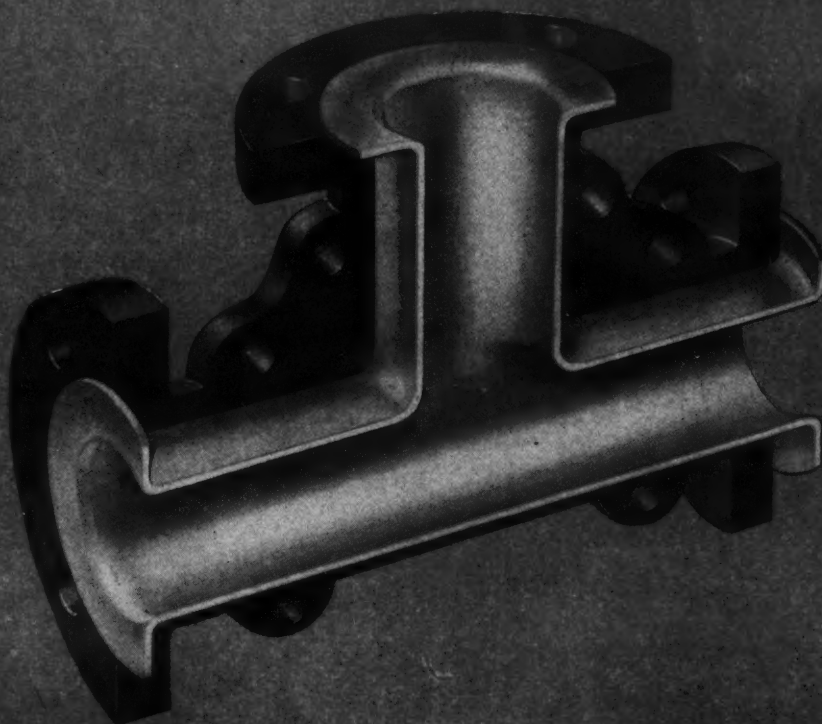
Overall result is that the bags have increased the operating efficiency, cut labor costs, and slashed material costs.

Fabric's mildew-proof qualities permit bags to be washed, stored, and re-used, ending disposal losses when production demands have been temporarily met.

(Centrifuge bags were supplied by the National Filter Media Corporation, 1717 Dixwell Avenue, New Haven, Connecticut.)

Check 1576 opposite last page.

It's the inside that counts in handling corrosives...



Protect against costly breakdowns by using pipe lined with a TFE-fluorocarbon resin

In handling corrosive materials, maintenance can be a major problem. A single shutdown for pipe repair can cost you more than an entire piping installation. In corrosive services, the only pipe worth using is pipe you don't have to replace . . . pipe lined with a TEFLON TFE-fluorocarbon resin. This pipe is unaffected by the most powerful acids, bases, and solvents.

For example, pipe lined with a TFE-fluorocarbon resin replaced stainless steel pipe in a process stream containing sulfuric acid, sulfur, and sodium sulfate in water, under pressure, at a temperature of more than 240°F. Corrosion was eliminated, and, with it, the possibility of contamination with metal ions, which can often act as catalysts. The non-adhesive surface of the liner prevents plugging by the high viscosity material.

TFE-fluorocarbon pipe lining has many other advantages. It won't shatter under vibration or thermal or physical shock,

like brittle liners. It can be used at temperatures up to 500°F. The liner flared over the flanges provides complete protection for the steel from the process fluid and eliminates the need for additional gasketing. And now you can get a complete assortment of standard sizes of flanged pipe and fittings, including tees, elbows, and reducers, all lined with Du Pont TEFLON TFE resin.

To minimize maintenance and downtime in chemical services, install pipe lined with TEFLON TFE resins. Check with your local supplier for details, or, for more information, write to: E. I. du Pont de Nemours & Co., (Inc.) Polychemicals Department, Room 910, Du Pont Building, Wilmington 98, Delaware.

IN CANADA: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

TEFLON®
TFE-FLUOROCARBON RESINS

TEFLON is Du Pont's registered trademark for its fluorocarbon resins, including the TFE (tetrafluoroethylene) resins discussed herein.

Check 1577 opposite last page

You find Gates Hose where anything flows Mackinac Bridge, world's longest suspension bridge, connects upper and lower peninsulas of Michigan. Because reliability of equipment is an important factor in the grouting operations, Gates Water and Air Hoses were used.

PHOTOS COURTESY MACKINAC BRIDGE AUTHORITY

**Gates Air Hose
helps build bridge
"that couldn't be built"**

Industry everywhere depends upon Gates Industrial Hose to provide air, water, steam, oil and suction for every type of application, including some of the toughest jobs in the world.

Actually there are *tens of thousands of miles* of Gates Hose in daily use — every type and size from air hose the diameter of a pencil to petroleum hose as big as the mains in city streets.

Back of the world-wide acceptance of Gates Hose is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States and in 90 countries throughout the world . . . and its outstanding performance is guaranteed by the *World's Largest Maker of V-Belts*.

Gates 18HB Air Hose, with oil resistant tube and abrasion resistant cover, gives exceptional performance on all heavy duty air usage. This popular hose — one of many in Gates full line — is always available from your nearby Gates Distributor.

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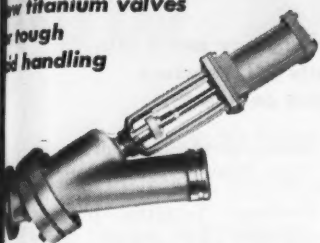
to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 1578 see information request blank opposite last page.



PROCESS PIPING POINTERS

new titanium valves
tough
handling



Best example of special development for severe corrosive-erosive fluid handling is this 5-in. cast titanium globe valve for service involving an acid slurry. Seat and disc are ceramic material. Flow-pattern body gives desired flow-through and seat tightness characteristics. Designs developed include both hand-wheel-operated type and cylinder-operated as shown. For more information, see below. Please mention titanium valves.

What valves for guided missile and rocket fuel services?

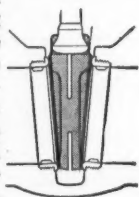
This book tells what's available

This is not a catalog but a basic data guide to selection of valves for use by missile fuel manufacturers... and valves for handling fuels and other fluids at launching pads, testing stations and operational bases. Includes all specification and ordering data. Registered copies supplied free on qualified requests. Ask for "Valves for Guided Missile and Rocket Services." See below.



Positive double blocking with one valve on hot hydrocarbon

For more than four years, this gate valve in a big midwest refinery has safely isolated hot hydrocarbon from oxygen-containing regeneration gas on an Ultraforming unit. Flexible wedge disc seating principle provides positive upstream and downstream seating — not possible with ordinary solid wedge or plug-type valves. For complete details, see next page.



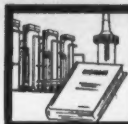
For literature or data on product listed above, please contact
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Chemical Sales Dept. No obligation.

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Check 1579 opposite last page

OCTOBER 1958



processing and engineering data

237

Scaling-up Equipment Costs

WILLIAM RESNICK, Chicago 15, Ill.

and

D. S. DAVIS

Head, Department of Pulp and Paper Technology
University of Alabama

Those who estimate cost of chemical equipment and plants are frequently faced with problem of determining costs at a capacity level for which there are no data.

If, however, there are cost data at some other capacity level, they can estimate cost at desired capacity with this nomograph.

Chart is based on the equation:

$$S_a/S_b = (C_a/C_b)^n$$

where S_a and S_b = costs of units a and b

C_a and C_b = capacities of units a and b

n = cost scale-up factor.

Values of n for different equipment^{1,2} are incorporated in the chart.

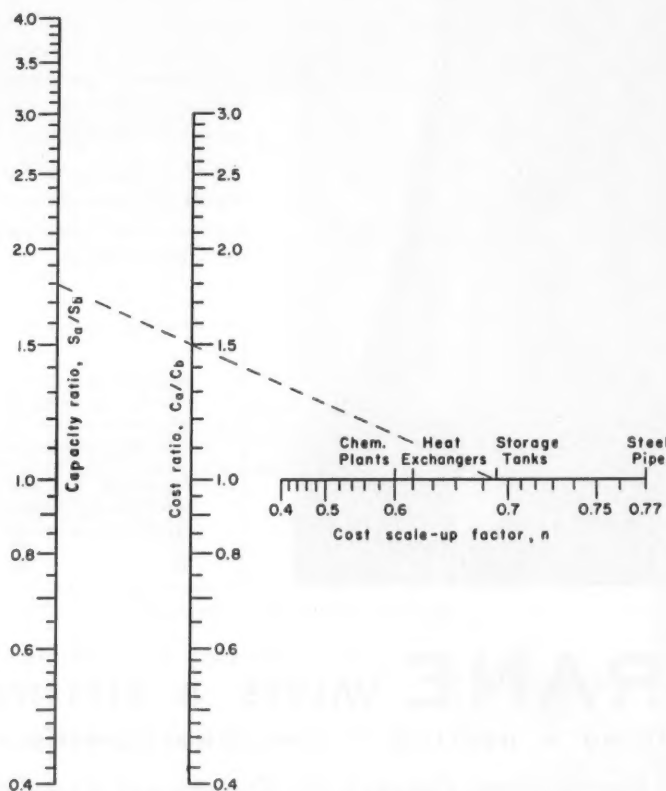
Typical Example

Use of chart is illustrated as follows: A storage tank with a capacity of 10,000 gal costs \$2600. What would be the cost of a tank with a capacity of 18,000 gal?

Broken line between capacity ratio of 1.8 and scale-up factor of 0.69 (for storage tanks) intersects cost ratio at 1.5. The larger tank would then cost $1.5 \times \$2600$ or \$3900.

LITERATURE CITED

- 1) DICKENSON, R. G., *Petrol Times*, 61, 573 (1957).
- 2) WILLIAMS, R., JR., *Chem Eng*, 54, 124 (1947).





Safety-Minded Refiner Uses CRANE Valves on Ultraformers

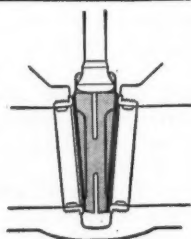
CRANE flexible disc gates hold hot hydrocarbon where other valves can't

The job of isolating the hot hydrocarbon from oxygen-containing regeneration gas in Ultra-forming units is given to Crane 14-inch, 600-pound steel gate valves with a *flexible* disc. Once the valve is closed, inert gas is injected between seating faces to purge all traces of hot hydrocarbon. Crane motor-operated valves of the type pictured have performed successfully in Ultraforming units for more than four years.

Ordinary solid wedge gate or plug-type valves cannot provide the positive upstream seating demanded for this and similar refinery operating conditions. The Crane *flexible* wedge disc greatly minimizes the possibility of seat leakage caused by line strains or by uneven temperature or pressure conditions.

For complete details about Crane *flexible* wedge disc gate valves for process or power piping, see your Crane Representative or write to the address below.

Showing positive wedging principle of Crane flexible disc gate valve.... holds tight at both seat faces...upstream and downstream. Also overcomes sticking of disc when closed hot and opened cold.



CRANE VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING • KITCHENS

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Check 1580 opposite last page

NEW SOLUTIONS

Emergency patch job puts CCl₄ reactors back on line fast

Epoxy/glass cloth kit helps
keep Stauffer production up

Problem: Lengthy process shutdowns for repair were necessary when corrosion opened small holes in vessels of Stauffer Chemical Company's CCl₄ process, Niagara Falls, N. Y. Even the simplest job of filling and welding held up production for 24 to 36 hr.

Solution: In the spring of 1957, plant maintenance started using a Sonite repair kit for emergency repairs. Kit contains glass cloth, epoxy resin, and catalyst. Cloth has been finished to be wetted by and take up the resin easily.



CP Staff Photo

Epoxy/glass cloth repair patch on this surge tank is on top, above discolored area on side

(Kits supplied today include Metalset A-4 aluminum epoxy cement for repair of small cracks and seams. Easier-to-use 4" glass tape has been substituted for the glass cloth.)

In making repairs, damaged area of tank is first sanded so there are at least 3" of clean, bright metal around it. Then, three or four layers of glass cloth are cut to fit the area.

Next, catalyst and resin are mixed and put into flat pan. First cloth layer is soaked in mixture and then pressed over damaged area. Succeeding layers are put on without any

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For more information on product at right, specify 1581... see information request blank opposite last page.



CHEMICAL PROCESSING

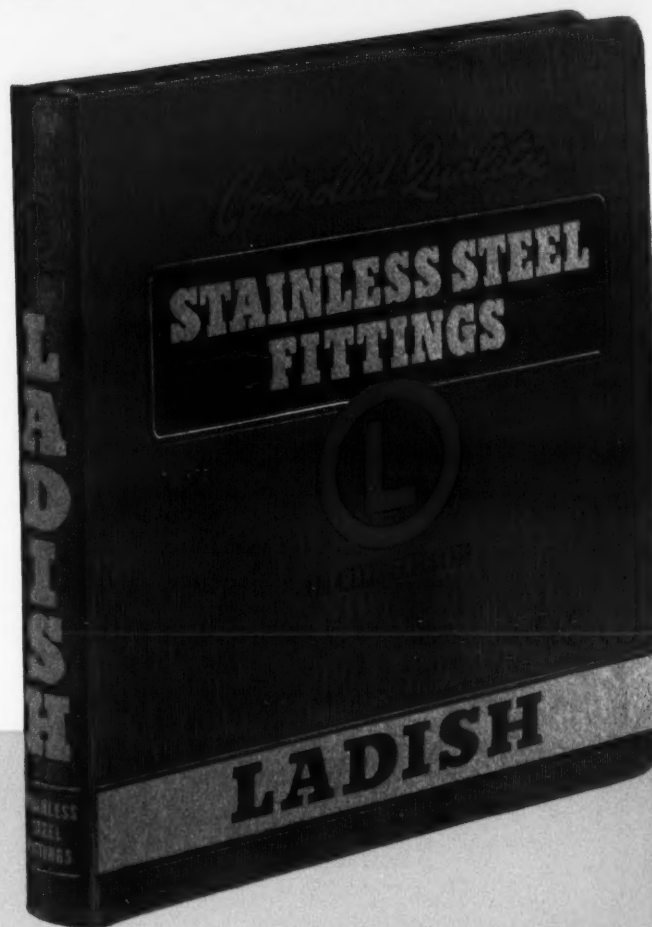
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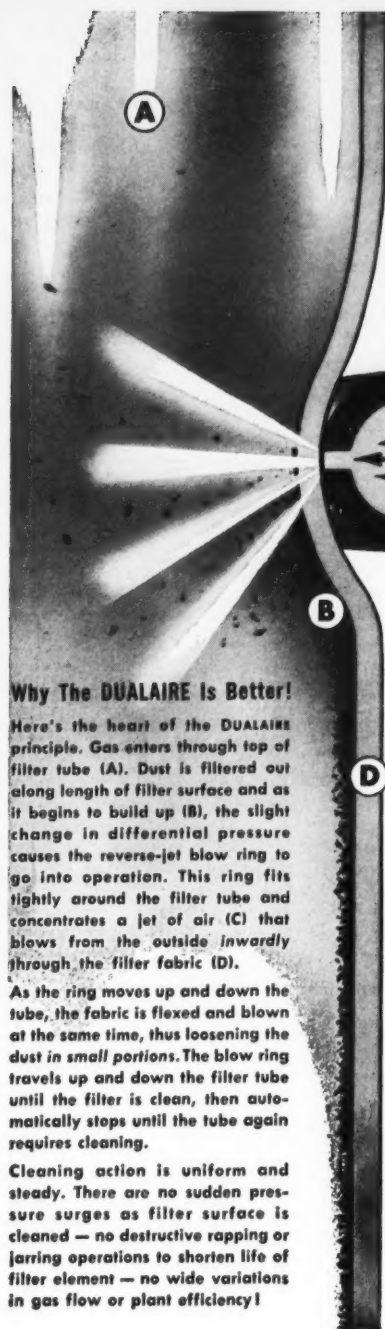
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Why The DUALAIRE is Better!

Here's the heart of the DUALAIRE principle. Gas enters through top of filter tube (A). Dust is filtered out along length of filter surface and as it begins to build up (B), the slight change in differential pressure causes the reverse-jet blow ring to go into operation. This ring fits tightly around the filter tube and concentrates a jet of air (C) that blows from the outside inwardly through the filter fabric (D).

As the ring moves up and down the tube, the fabric is flexed and blown at the same time, thus loosening the dust in small portions. The blow ring travels up and down the filter tube until the filter is clean, then automatically stops until the tube again requires cleaning.

Cleaning action is uniform and steady. There are no sudden pressure surges as filter surface is cleaned — no destructive rapping or jarring operations to shorten life of filter element — no wide variations in gas flow or plant efficiency!

There are many other advantages built into the DUALAIRE. For further details send for descriptive 8 page booklet. Or contact your nearest Western Precipitation representative!



COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

If you use filter systems...

CHECK THESE MULTIPLE ADVANTAGES

OF THE REVOLUTIONARY JET-CLEANED

Dualaire*



DUST COLLECTOR!

No pressure surges!

No filter choking!

Efficiencies up to 99.99%!

If you use bag-houses or other similar collecting systems in your plant operations, be sure to investigate the *many* vital advantages built into Western Precipitation's new DUALAIRE Dust Collectors. Backed by the same well-known organization that pioneered commercial application of COTTRELL Electrical Precipitators and MULTICLONE Mechanical Collectors, DUALAIRES bring entirely new performance and efficiency standards to filter-type collection systems.

As outlined at the left, heart of the DUALAIRE is a jet-cleaning blow ring that travels up and down the cloth filter tube, keeping it clean without the alternate choking and pressure surges characteristic of conventional rapping, vibrating, or jarring systems of cleaning off the collected dust.

► **UNIFORMLY LOW PRESSURE DROP** is assured, because the collected dust is removed steadily and in small increments — not by sudden surges!

► **UNIFORMLY HIGH EFFICIENCIES** — as high as 99.99% under actual field conditions — are maintained by the constantly-cleaned filter surfaces. There is no "choking" action — no variation in filter capacity as dust accumulates!

► **LONGER FILTER LIFE** is obtained because the filter fabric is not subjected to destructive jarring, rapping and vibration of conventional filter cleaning methods. The Dualaire cleaning action is gentle — yet far more effective!

► **LESS EQUIPMENT IS REQUIRED** to handle a given capacity with the Dualaire because no standby sections need be provided for gas cleaning while other sections are shut off for rapping.

The Dualaire filter is kept constantly clean — automatically — while it is filtering out the suspensions. The gas is filtered and the dust removed simultaneously — without interruption. Saves space, simplifies installation!

► **MAXIMUM ADAPTABILITY** to varying installation requirements is assured by the "sectionalized" design of the Dualaire. Each section is available in 5 different heights — and as many sections can be bolted together as desired to meet plant requirements. As needs increase, simply add more sections!

► **EFFICIENT STRAIGHT-THRU DESIGN** of filter tubes assures easier dust recovery, better flow. Dirty gas enters top of tube, is filtered through the walls, and dust drops by gravity through bottom of tube into collection chamber. Separated material does not re-entrain in the gas flow



WESTERN

PRECIPITATION

CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

Check 1582 opposite last page

GREENS

4 Pure Chromium Oxides

and

2 Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.

Your nearest Williams representative will be glad to provide you with full technical data and samples, or write Dept. 75, C. K. Williams & Co., Easton, Penna.

WILLIAMS
COLORS & PIGMENTS

EASTON, PA. • E. ST. LOUIS, ILL.
EMERYVILLE, CAL.



processing and engineering data

238

Emergency Vent Size for Uninsulated Pressure Tanks

... containing liquids below 100°F flashpoint

CLIFFORD L. DUCKWORTH
East Alton, Ill.

Emergency vent sizes can usually be calculated for uninsulated pressure tanks containing liquids with flashpoints below 110°F from the equation¹:

$$D = (XS)^{1/2}$$

where D = internal diameter of vent, inches
S = total external surface of tank, sq ft
X = a factor correlating working pressure.

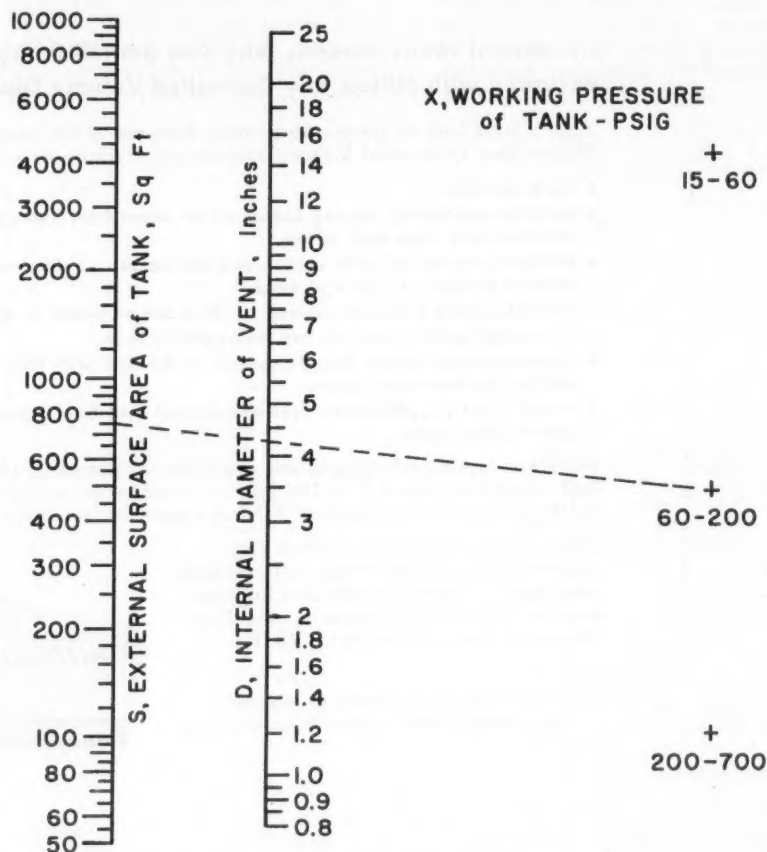
Accompanying nomograph easily solves equation for working pressure ranges of 15-60 psig, 60-200 psig, and 200-700 psig.

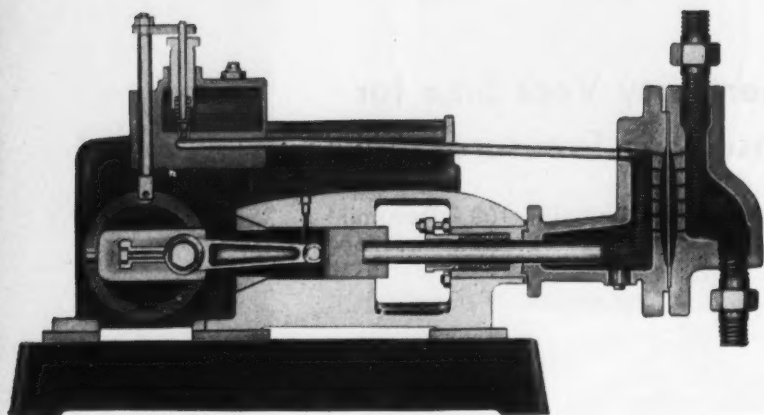
Typical Example

For a tank with total exposed surface of 750 sq ft and containing ethanol at pressure of 150 psig, the emergency vent size should be 4.25 inches in diameter.

LITERATURE CITED

- 1) "Recommended Good Practice for Safeguarding Flammable Liquids, Storage and Processing," Factory Insurance Association, p 31, 1953.





This diaphragm pump can't air bind

... one of many reasons why you get reliability and accuracy with Milton Roy Controlled Volume Diaphragm Pumps

Take a good look at these outstanding features of the new Milton Roy Controlled Volume Diaphragm Pump:

- no air pockets.
- positive mechanical valving bleeds air or vapor from hydraulic fluid automatically once each stroke.
- uniform pressure on both suction and discharge . . . diaphragms move without tendency to twist or bend.
- non-lubricating hydraulic system . . . fluid can be water, or other liquid.
- no moving parts to beat air into the hydraulic fluid.
- diaphragm liquid ends interchangeable in the field with Milton Roy packed plunger liquid ends.
- monel fillers . . . effectively seal and prevent cold flow of the plastic diaphragm.

Standard liquid end designs are available for pressures to 1,000 psi and capacities from 1.1 to 138 gph . . . manual or automatic 0-100% capacity adjustment. Higher capacities available.

Take another look at the Milton Roy approach to your metering and pumping problems . . . write for detailed information to Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers



Check 1584 opposite last page

NEW SOLUTIONS

From page 62

waiting or drying in between. Without an extra source of heat, complete patch will dry in about two hours. Heat lamps, not used by Stauffer, can cut this to 10 or 15 minutes.

Hardened patch is sanded smooth to prepare it for painting. It takes paint, or lacquer, readily.

Stauffer has used this method on three occasions, all on tops of mild-steel vessels under essentially atmospheric pressure. One vessel was a 110,000-gal surge tank, two were 4'-diam by 7'-high reactors. One had a hole the size of a half-dollar, the other two had 6"-long strip openings.

Results: New patching method has cut an average of 24 hours from the downtime for emergency repairs. True, more-permanent repair has to be made eventually, but this can be scheduled for a regular shutdown. (It's interesting to note that one of these "emergency" patch repairs was in place, and going strong, when vessel was given permanent repair in a regular shutdown.)

So far, no patch has been used on a vessel under pressure. But Stauffer plant people indicate they would have no fear of trying it . . . judging by the excellent results they have had so far.

(Sonite repair kit is product of Smooth-On Manufacturing Company, 572 Communipaw Ave., Jersey City 4, N. J.)

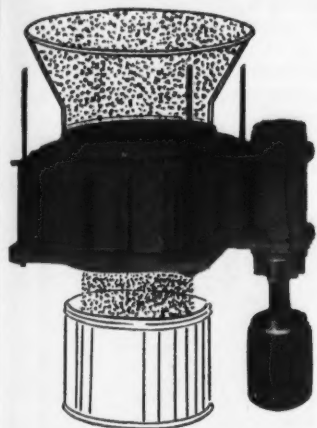
Check 1585 opposite last page.

Chemical cleaner report covers effects of repeated acid cleanings on boilers, heat exchangers, and process equipment. Cases such as a Midwestern chemical company's trisodium phosphate evaporator having been cleaned 44 times by chemical cleaner are cited in four-page bulletin. Chemical Cleaner Report — Dowell Incorporated, Service Subs. of Dow Chemical Company, PO Box 536, Tulsa 1, Okla.

Check 1586 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

for effective
separation of
IRON PARTICLES
from powdered and
granular materials



Dry

Electromagnetic Separators

Frantz Dry FERROFILTERS are made in two sizes — capacities to 25 tons per hour depending on specific gravity, fineness and moisture content of materials. Adjustable vibrator provides right amount of "shake" for each material handled.

Other FERROFILTERS available for handling liquids and slurries — Gravity, Pipeline and Underfeed models.

Send for BULLETIN 56-E

Shows complete line of FERROFILTERS for both wet and dry materials. Tables of sizes and capacities to help you select right model for your job.

S. G. FRANTZ CO., INC.

Brunswick Pike & Kline Ave.

P. O. Box 1138 Trenton 6, N. J.

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OCTOBER 1958



processing and engineering data

239

Excess Air Nomograph for Combustion of Tar and Oil

NEIL M. DANIELS

Provo, Utah

This nomograph enables one to compute percentage of excess air for combustion of liquid fuels (tar and oil) when rates of consumption of each fuel and total amount of air supplied are known. Although designed specifically for use in heating open hearth furnaces, it is offered for its own utility and as a guide to those who can adapt it to their own requirements.

Nomograph is designed to solve equation:

$$P = \frac{2.1 \times 10^6 A}{1550(800T + 900F)} - 100$$

where P = excess air, %

A = reading on air flow meter, %

T = reading on tar flow meter, %

F = reading on oil flow meter, %

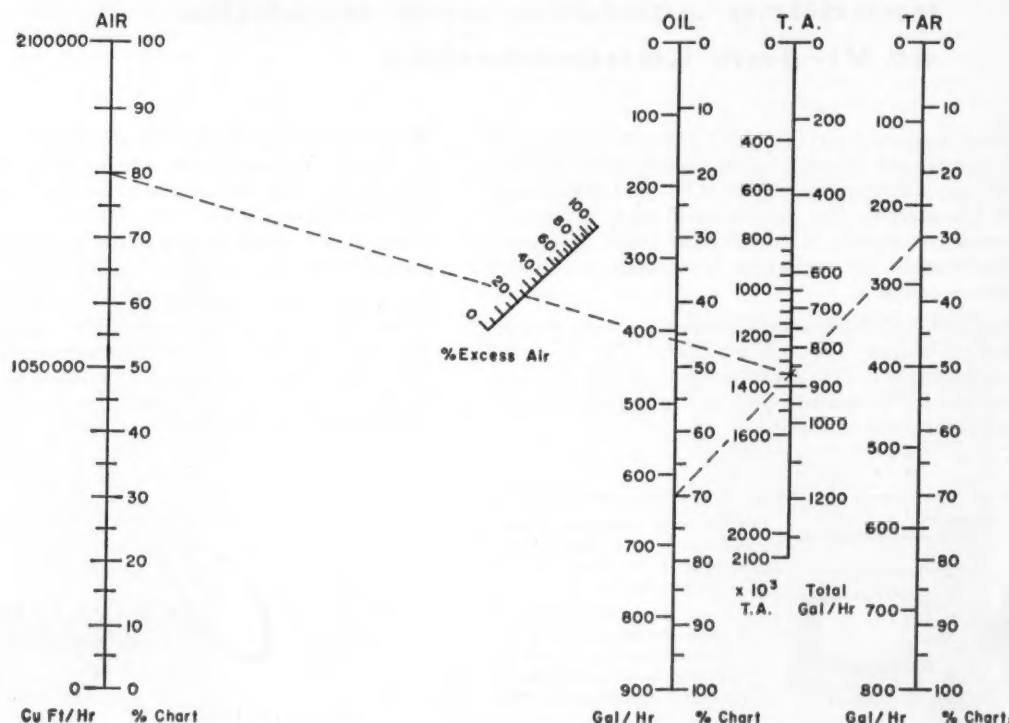
In this instance, 100% on flow meter indicator for tar corresponds to 800 gph; 100% on oil flow meter corresponds to 900 gph; 100% on air flow meter corresponds to 2.1 million

cu ft/hr. For theoretical and complete combustion, one gal of tar and one gal of oil require, respectively, 1553 and 1545 cu ft of air at entrance temperature and pressure. A reasonable average value is 1550 cu ft/gal.

TYPICAL EXAMPLE

For an open hearth furnace burning tar and oil under conditions described, what is percentage excess air when flow meter indicators for tar, oil, and air read 30, 70, and 80%, respectively?

Connect 30% on tar scale with 70% on oil scale and read rate of consumption of fuel and amount of air theoretically required on right and left sides of T.A. axis as 870 gal/hr and 1350×10^3 cu ft/hr, respectively. Connect this point with 80 on air scale at left of chart and read percentage of excess air on slant scale as approximately 25.





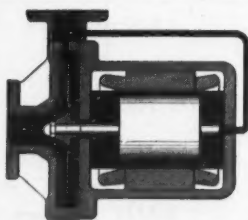
Chempump eliminates fire hazard handling acetone and naphtha at Vi-Jon Laboratories

This *Chempump* moves a highly inflammable mixture of acetone and naphtha in the manufacture of chemical specialties and cosmetics at Vi-Jon Laboratories' St. Louis plant. The conventional pump it replaced leaked continually at the packing gland, creating a fire hazard. The leakproof *Chempump* solved this serious problem.

For Vi-Jon Laboratories, *Chempump* means maintenance economy as well as safety. The company reports there has been absolutely no maintenance on the pump. "It was installed and forgotten, as far as maintenance is concerned."

With *Chempump*, hard-to-handle fluids can't leak—in or out—because there are no seals, no stuffing box, no packing. Occasional inspection and replacement of bearings is the only care required. External lubrication is never needed—bearings are constantly lubricated by the pumped fluid itself.

Leakproof fluid handling with *Chempump* offers many other advantages well worth your investigation. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

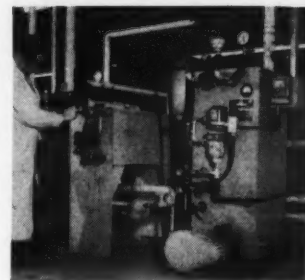
Check 1588 opposite last page

NEW SOLUTIONS

Lab's steam requirements furnished by compact, electric boilers

Small individual electric steam boilers have proven to be a very efficient method of supplying heat for laboratory and pilot plant equipment at W. R. Grace & Co., Polymer Chemical Division's new service laboratory in Clifton, New Jersey.

Big advantages are space economy, quick response, and



Electric steam boiler (right) supplies 350°F, 150 psi steam to various equipment in lab

flexibility. The electrode-type units operate with little or no attention. They are 98½% efficient, heating up to full pressure in 8 to 10 min from a cold start.

Electrodes are suspended in sleeve-type generating chamber. If water level falls below ends of electrodes, unit automatically shuts off.

One of the boilers used in the lab is a 7½ hp unit supplying 350°F, 150 psi steam through insulated 1" pipe laid out in a loop through both the tech service and research lab. System includes condensate tank and return pump. Steam is used in such equipment as Banbury mills, compression presses, and sterilizers. A 2-hp boiler has been installed to heat jacketed laboratory reactor.

At each point of steam use in the lab, indicating pressure gages, dial thermometers, and steam pressure reducing stations are installed.

(Speedyelectric boilers are product of Pantex Manufacturing Corporation, 521 Roosevelt Avenue, Pawtucket, R.I.)

Check 1589 opposite last page.



CHEMICAL
MATERIALS

Isophthalic acid-based resin is delivered to the W. P. Fuller & Co. plant in 50-gal drums. Plant will soon install a tank storage and pump system for direct feeding of resin

While furnishing better adhesion, quicker drying,
and easier application, isophthalic acid-based
alkyd resins provide —

Greater color retention for house paints

Use of isophthalic acid permits resin manufacturers
to go to higher processing temperatures without deg-
radation, makes films flexible and tough, and allows
formulation with any drying-type oil or fatty acid

W. P. Fuller & Co.—largest paint manufacturer in the West, with an 11-state marketing area — recently announced a new exterior house paint based on isophthalic acid resin which has outstanding color retention. Service tests conducted over the past several years on hundreds of western homes indicate that a fresh, newly painted look is retained for two years longer

than with a conventional house paint.

Fuller tested its new paint under all types of climatic conditions — from Montana's harsh winters to Seattle's excessive dampness to Arizona's desert heat. Test results disclosed several advantages for the isophthalic-based coating in addition to its superior color retention.

The new paint provides im-

proved adhesion, which minimizes surface preparation needed. It dries fast, drying dust-free in two to three hours under normal drying conditions. Paint is also easier to apply. Used directly from the can without thinning, it flows and levels better than conventional coatings.

Although they have been under active investigation by a number of companies for several years, this marks the first big breakthrough for isophthalic-based resins in the house-paint market. It is a significant development in the paint field.

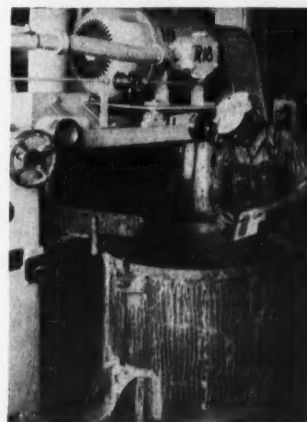
Isophthalic acid serves as a raw material for resins, which, in turn, are used in the paint. A typical resin would contain 119 parts isophthalic acid, 57 parts pentaerythritol, and 850 parts of any oil selected by the manufacturer. Finished resin would have following properties:

Vis (Gardner-Holt)	Z3 to Z4
Acid No.	7 to 8
Color	Approx 8

Isophthalic acid provides a big advantage to resin manufacturers in that it can be used with the most economical oil or fatty acids available.



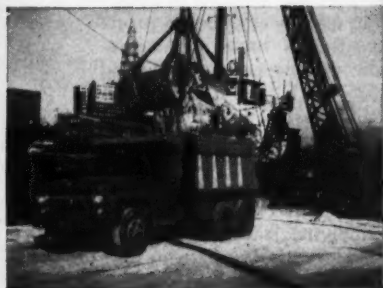
Gloss retention test being conducted on new paint



Pigment is dispersed in paint with roller mill

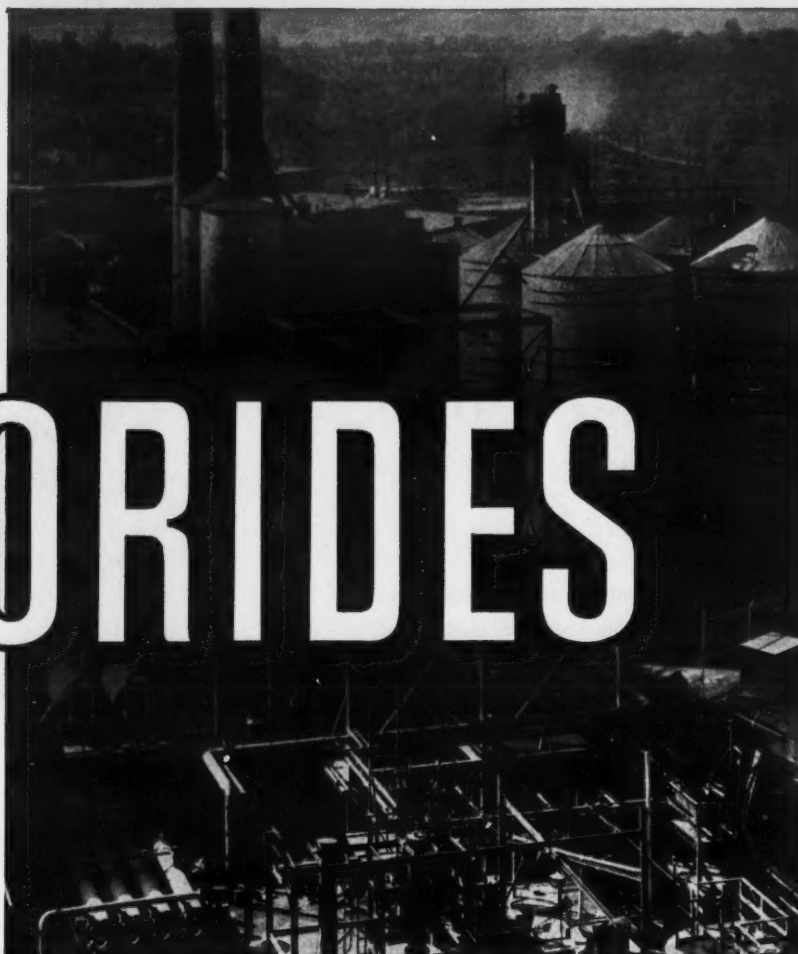
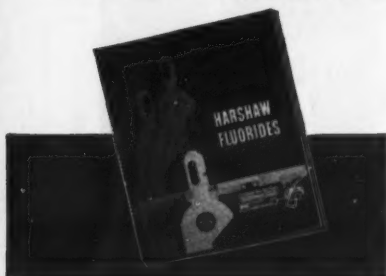
HARSHAW FLUORIDES

manufactured
in one of the
largest facilities
in the world



Unloading mineral fluorospar which comes to us from various parts of the world.

Write for your free copy of M.C.A.
Chemical Safety Data Sheet SD-25 on properties
and essential information about
HYDROFLUORIC ACID Anhydrous and Aqueous.



BORON TRIFLUORIDE HYDROFLUORIC ACID ANHYDROUS...AQUEOUS

and a long list of other
production-controlled high-quality fluorides

Ammonium Bifluoride	Hydrofluoric Acid Aqueous
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Antimony Trifluoride Sublimed	Lead Fluoborate
Barium Fluoride	Metallic Fluoborates
Bismuth Fluoride	Nickel Fluoborate
Boron Trifluoride	Potassium Bifluoride
Boron Trifluoride Complexes	Potassium Chromium Fluoride
Cadmium Fluoborate	Potassium Fluoborate
Chromium Fluoride	Potassium Fluoride
Copper Fluoborate	Potassium Titanium Fluoride
Fluoboric Acid	Silico Fluorides
Fluorine Cells	Sodium Fluoborate
Fluorinating Agents	Tin Fluoborate
Frosting Mixtures	Zinc Fluoborate
Hydrofluoric Acid Anhydrous	Zinc Fluoride

If required you are invited to draw on the knowledge and experience of our staff of technical specialists on fluorides.

The Harshaw Chemical Company

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HASTINGS-ON-HUDSON, N. Y. • PHILADELPHIA • PITTSBURGH

Check 1590 opposite last page

CHEMICAL MATERIALS

cosity that is desired.

Isophthalic acid also provides increased film flexibility and toughness for the resin, advantages which are imparted to the paint film. Flexibility of resin made from isophthalic is attributed to a higher proportion of linear chains rather than cross-linkage of a large number of low-molecular-weight compounds.

Fuller, the first major paint manufacturer to take commercial advantage of isophthalic's unique properties, began testing the new material in 1951. It was this early start which enabled the company to complete a series of extensive panel and house painting tests, and to establish an important "first" in the paint market.

Several other paint manufacturers throughout the U.S. are testing isophthalic-based resins in their various paint formulations. Many have reported excellent results from their panel tests, and house-painting test programs are being started.

While the house-paint field offers a large potential market for isophthalic acid, it is by no means the only market for this important new chemical raw material. Isophthalic is finding increasing application in such products as industrial coatings, reinforced plastics, plasticizers, and high polymers.

(Isophthalic acid is product of Oronite Chemical Co., 200 Bush St., San Francisco 20, Calif.)

Check 1591 opposite last page.

(Isophthalic-acid-based resins used at W. P. Fuller are product of Reichhold Chemicals, Inc., 525 N. Broadway, White Plains, N.Y.)

Check 1592 opposite last page.

(Resins made from isophthalic acid are also being made by a number of other manufacturers.)

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

CHEMICAL PROCESSING

**High-temp plastic glazer
has top optical qualities
and craze resistance**

To achieve weight savings in aircraft, missile design

Uses: For chemical, aircraft, electronic, or industrial applications requiring a stable transparent glazing material.

Features: According to manufacturer, product is said to be highest temperature plastic glazing material commercially available. It is claimed to have outstanding optical qualities and excellent craze resistance. Plastic gives weight savings in design of aircraft and missiles, and makes possible improved operational, production, and processing techniques.

Description: Cast polyester-base, thermosetting plastic is processed initially in a partially cured condition and is fully cured after final forming. It maintains good contour stability under high surface temperatures up to 300°F.

(Sierracin 880 is product of The Sierracin Corporation, 1121 Isabel St., Burbank, California.)

Check 1593 opposite last page.

**Alkyl dimethyl amines
are resin catalysts
of high quality**

Also used as intermediates for sanitizers

Uses: As catalysts for polyurethane resins and intermediates for sanitizers.

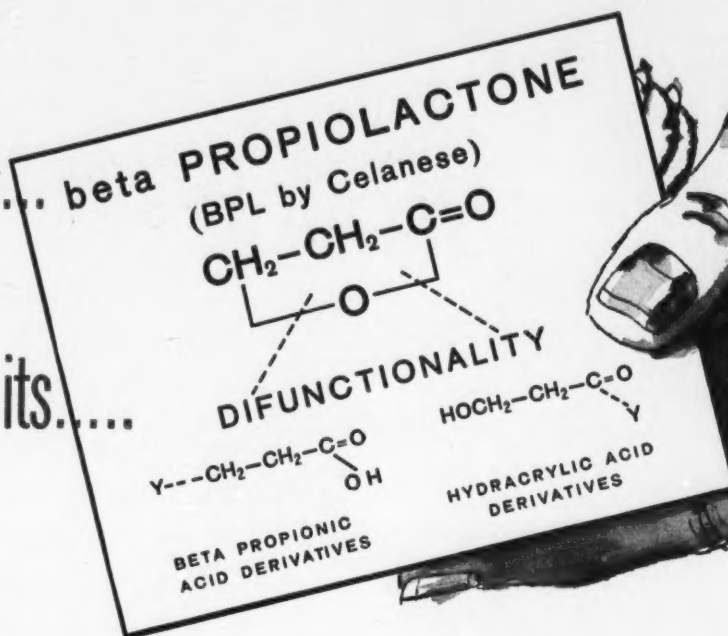
Features: Process used to produce amines yields products of unusually high quality.

Description: Alkyl dimethyl amines are available in wide range of molecular weights to fit specific needs. Technical grade, Sipene LDX, is comparable in quality to distilled grades now available. Sipene LDC is practically water-white and contains 95-96% alkyl dimethyl amine.

(Sipene alkyl dimethyl amines are product of American Alcolac Corp., 3440 Fairfield Road, Baltimore, Md.)

Check 1594 opposite last page.

what
can
you
do
with...
and its....



now available in commercial quantities

Latest news in intermediates is beta-Propiolactone (BPL), a starting material with remarkable versatility—difunctionality—that immediately suggests the synthesis of important new products. How can you use BPL—or its derivatives? In starch emulsions? In adhesives? In textile fibers? Why not find out immediately?

Write today for samples for your own evaluation, and for technical Bulletin No. N-61. Celanese Corporation of America, Chemical Division, Dept. 591-J, 180 Madison Avenue, N. Y. 16.

Celanese® BPL™.M.



**TYPICAL PROPERTIES
OF CELANESE BPL**

beta-Propiolactone, wt., % min.	97
Physical state	Liquid
Color	Colorless
Odor	Pungent, acrylic
Boiling Point, deg. C.	162
Refractive index @ 20°C	1.4131
Specific gravity @ 20/20°C	1.1490
Pounds per gallon @ 20°C	9.56
Flash point, Tag open cup, deg. F.	165

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

See Chemical Materials Catalog and Chemical Week Buyers' Guide for complete listing of Celanese Chemical Products.

Check 1595 opposite last page

**Gives castor oil benefits
in aqueous systems**

Uses: As emulsifiers for cosmetics, emulsion paints, insecticides, and oil extracts.

Features: By use of compounds, performance benefits of castor oil may be employed in aqueous systems. Compounds stabilize emulsion systems and promote leveling of emulsion paints.

Description: Series of non-ionic surface-active agents derived from castor oil are offered on pilot-plant scale. Castor oil has been modified by ethoxylation to four different stages so that, in hydrophilic properties, products range from moderately self-emulsifiable to completely soluble in water.

(Sufactol products are available from The Baker Castor Oil Company, 40 Avenue A, Bayonne, N.J.)

Check 1596 opposite last page.

**Cut down on materials,
yet maintain content
of mercury metals**

Permits lower-cost formulas

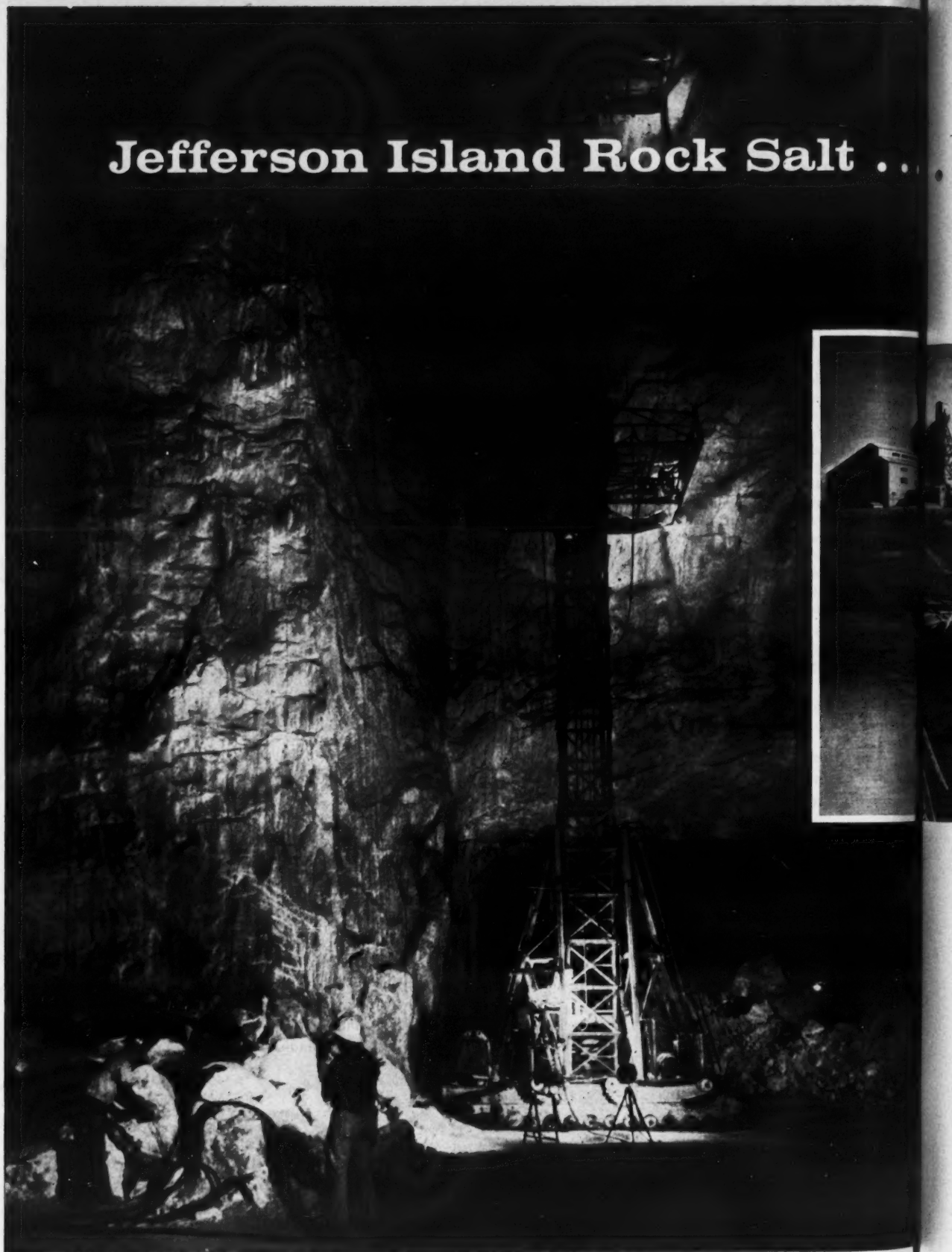
Improved higher concentration of phenyl mercuric acetates and phenyl mercuric oleates are now available in commercial quantities. The products, Puratized OL-40 (PMO-40%) and Puratized SC-440 (PMA 40%), contain, respectively, 14.36% and 24% mercury metal.

Availability of higher concentrations will enable chemists to use less materials, and at the same time maintain the original mercury content of formulas at substantially lower costs. PMO solvent is mineral spirits instead of high-flash naphtha. This brings Gardner Color basis down to a maximum of 5 even at higher concentrations. PMA is completely water-soluble, and its maximum Gardner Color index is also 5.

(Puratized OL-40 and Puratized SC-440 are products of Gallowhur Chemical Corp., Ossining, N.Y.)

Check 1597 opposite last page.

Jefferson Island Rock Salt . .



so pure that every chemical manufacturer benefits



The picture above shows rock salt being loaded into barges at Jefferson Island, La., for movement through the Inland Waterways. Many chlorine, synthetic rubber and other heavy industrial plants use barging to effect both economy and service.

For many years, rock salt from Jefferson Island has made possible many economies in chemical processing.

Mined in Louisiana from one of the world's purest deposits, this rock salt results in a consistently better end product—without the costly side reactions of impurities found in less pure salt. The big story is up to 99% purity at the source.

TWO GREAT NAMES MERGE AS ONE

Recently, the Jefferson Island Salt Co., merged with Diamond Crystal, a company known for more than 70 years as a quality producer of flake and granular salt. For example, Diamond Crystal is the leading supplier of salt to high quality food processors.

Jefferson Island Division, on the other hand, is the largest supplier of industrial rock salt by barge on the inland waterways. In fact, they pioneered the first complete ocean-going barge movement of salt to Gulf Coast chemical plants.

INHERENT PURITY—KEY TO COST SAVINGS

The inherent purity in Diamond Crystal Salt is a major factor in *all* industries.

In addition, maximum customer economies and service can result from using Diamond Crystal's complete facilities.

For immediate service and consultation on your salt problem, call the nearest Sales Office or write: Jefferson Island Salt Div., Diamond Crystal Salt Co., St. Clair, Michigan.

DIAMOND CRYSTAL SALT

SALES OFFICES: CHARLOTTE, ATLANTA, NEW ORLEANS, LOUISVILLE, BOSTON, NEW YORK, AKRON, DETROIT, CHICAGO, MINNEAPOLIS
PLANTS: AKRON, OHIO . . . JEFFERSON ISLAND, LA. . . ST. CLAIR, MICH.

More flocculating action in given application with new agent

Uses: As flocculating agent for chemical processing, industrial waste treatment, mining, pulp and paper, and coal industries.

Features: According to manufacturer, agent is most active material available on a unit-weight basis.

Description: High-activity polyacrylamide-type flocculating agent is a synthetic, organic, water-soluble, high-molecular-weight polymer manufactured as a white amorphous flake. It has uniform effectiveness over a wide pH range.

(Separan NP20 is product of The Dow Chemical Company, Midland, Mich.)

Check 1599 opposite last page.

Disperses pigments, slows suspensions from separating

Uses: Agent designed to perfect water-based paints.

Features: Product disperses pigments exceptionally well and minimizes tendency of suspensions to separate.

Description: Product is improved soy dispersing and wetting agent compounded for latex-paint industry. It is nonionic, pale, low in viscosity, easy to handle.

(DispersaGen is product of General Mills Inc., 400 Second Avenue South, Minneapolis 1, Minnesota.)

Check 1600 opposite last page.

Micron-size silicas

Chemical and physical properties as well as applications of eleven Syloid micron-size silica products used for flattening, anti-blocking, thickening, and moisture removal, and in adhesives and insulation are in 12-page booklet. "Family of Syloid Silicas" — Davison Chemical Co., Div. of W.R. Grace & Co., Baltimore 3, Maryland.

Check 1601 opposite last page.

Check 1598 opposite last page

**Add bulk plus performance
for as little as 51¢/cu. ft.**

with MICRO-CEL®
SYNTHETIC CALCIUM SILICATES

Have you tried MICRO-CEL... Johns-Manville's synthetic calcium silicate that's setting a new standard for performance?

At a delivered cost of 8¢ to 10¢ per pound MICRO-CEL can match—even outperform—many higher-priced fillers in dry or liquid products. Check these three cost-cutting product improvements MICRO-CEL can give you.

1. In dry products, MICRO-CEL will bulk up to a full cubic foot for every six pounds. A little MICRO-CEL goes a long way toward improving product density, reducing package outage.

2. MICRO-CEL absorbs up to six times its weight in water... remains a free-flowing powder even when mixed with twice its weight of liquid...

controls viscosity... prevents caking.

3. MICRO-CEL particles are as small as .02 micron, blend and disperse well, extend pigments to the maximum.

MICRO-CEL, the powder that flows like a liquid, is a new line of inert synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. Its unique combination of properties has already brought important benefits and savings to many processors. Maybe you will be next.

For further information, samples and technical assistance write to Johns-Manville, Box 14, New York 16, New York. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.

↓
**IF YOUR
FORMULATION
NEEDS BULK...**
↑

**JUST 6 LB.
OF MICRO-CEL
ADDS A
FULL CU. FT.**



Johns-Manville MICRO-CEL
A product of the Celite Division

Check 1602 opposite last page

CHEMICAL MATERIALS

**Low cost film former
is vehicle, modifier
for emulsion paints**

Gives improved leveling and brushing

Uses: Hydrocarbon resin emulsion can be used as a complete vehicle or as a modifying agent in emulsion paints.

Features: Product gives emulsion paints with improved leveling and brushing properties with no sacrifice in scrubability, increase in cure time, or darkening on exposure. It is reported to be one of the lowest cost film formers available.

Description: Designated W-617, product is an anionic emulsion of a hydrocarbon copolymer resin. It can be used with acrylic, styrene-butadiene, alkyd, and other latex base materials.

(Resin emulsion W-617 is a product of Velsicol Chemical Corporation, 330 E. Grand Ave., Chicago 11, Ill.)

Check 1603 opposite last page.

**Modifier offers savings
in liquid epoxy
resin systems**

Organophosphorous product improves end properties

Uses: Modifier for liquid epoxy resin systems.

Features: Product offers improved end properties and savings in formulating costs. Priced at \$0.46/lb in carload drum lots, modifier can cut finished resin cost 20% while maintaining or improving end properties.

Description: Organophosphorous modifier, Mod-Epoxy, gives low initial viscosity to formulations. Recommended rate is 25 parts/100 parts resin although complete compatibility and miscibility permit wide latitude of use in formulating for specific properties. Compound is liquid at room temperature and has a low order of toxicity.

(Mod-Epoxy epoxy modifier is a product of Monsanto Chemical Co., St. Louis 24, Mo.)

Check 1604 opposite last page.

CHEMICAL PROCESSING

CHEMICAL MATERIALS

Seven items added to company's list

Manufacturer has made available seven compounds.

Gallie Acid — NF technical crystals for manufacture of dyes and raw material for pyrogallol and bismuth subgallate.

Lauroyl Chloride — 99% minimum purity. Water-white to very pale straw raw material for emulsifying agents.

Barium Chloride — technical crystals for manufacture of ceramics, dyes, and insecticides.

Barium Acetate — 99% minimum purity. A textile dyeing mordant and barium chemical intermediate.

Barium Carbonate — precipitated. Paint filler and precipitant for soluble sulfates. Also intermediate in dyes, rubber, plastics, and paper.

Anthraquinone — 30% paste for dyestuff manufacture.

Lead Nitrate — 99.2% purity. Strong oxidant is used in manufacture of explosives, paints, dyes.

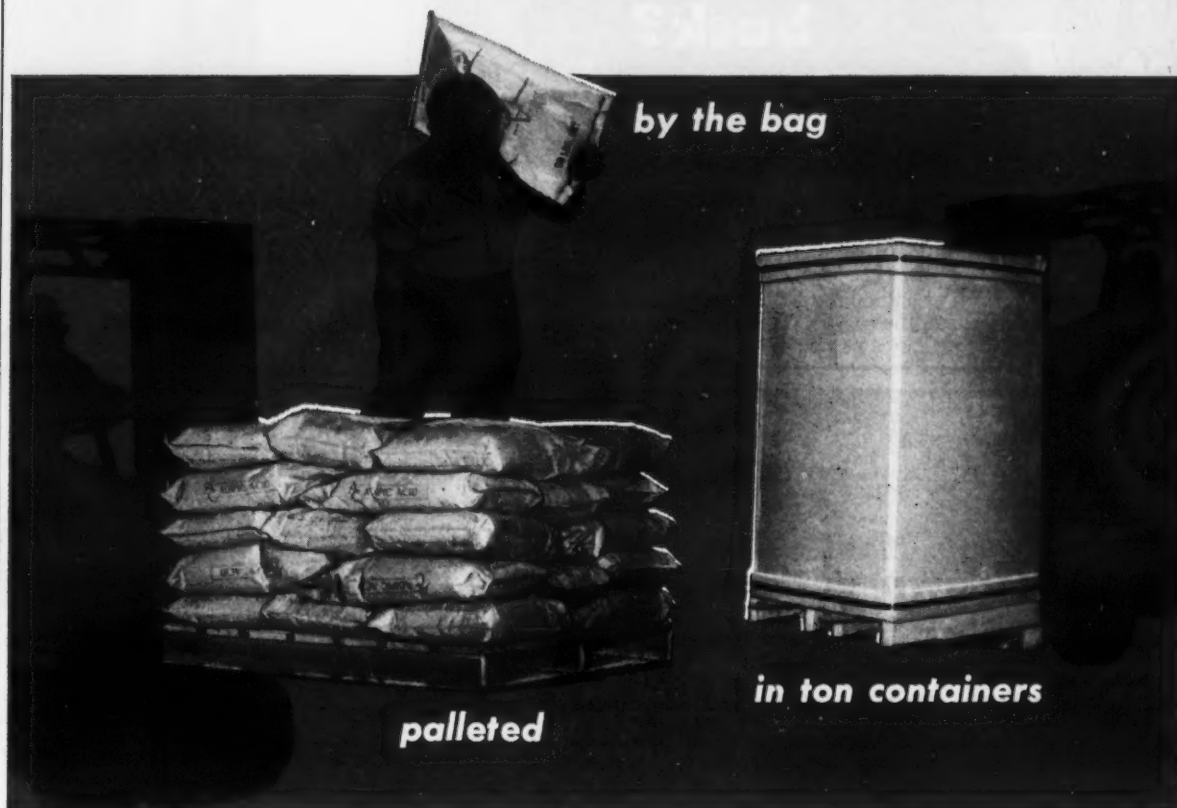
(For more information on above compounds contact Hummel Chemical Co., 90 West St., New York 6, N. Y.)

Check 1605 opposite last page.



"We're asking all our guests to perform, Dr. Wallaby; and since you are a nuclear physicist, I'm sure you won't mind splitting an atom."

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Any way you want it, you're sure of exceptional service from National Aniline . . . by truck or rail from our Hopewell, Virginia plant and from ample branch office warehouse stocks.

Production by our direct, continuous process is completely integrated within the Allied Chemical group. Quality is unsurpassed . . . 99.8% minimum purity, light in color and low in moisture, iron and volatile acids.

Adipic acid has broad application in the manufacture of plasticizers (particularly for low temperature use), polyester resins for urethane foams, synthetic lubricants, fibers, elastomers, alkyd resins, etc. It shows excellent promise in a variety of other uses as well.

If you use adipic acid or have a potential interest in it, we will be glad to send you a sample and copy of our newly revised Technical Bulletin I-12R.

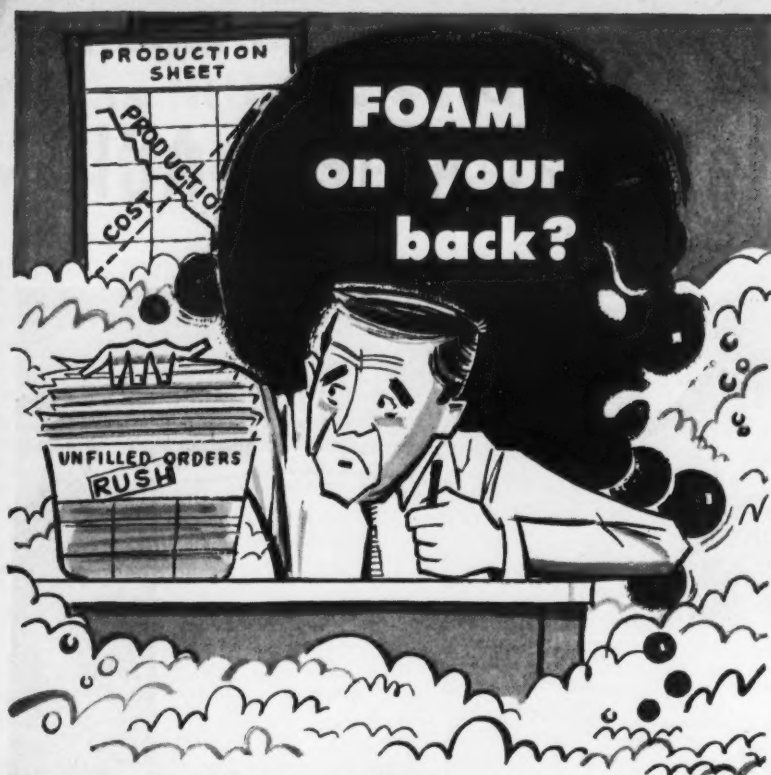


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Check 1606 opposite last page



knock it down with a Dow Corning SILICONE DEFOAMER!

If foam has you down (and your processing too), try a Dow Corning SILICONE DEFOAMER. Get this costly menace off your back for good.

Here are examples of how these versatile foam killers have killed foam and increased capacity in different production processes.

1 oz
kills foam in:

- 31,250 lb dog shampoo
- 59,110 lb wire drawing solution
- 62,500 lb alcohol-varnish
paper coating solution

FREE SAMPLE! Make your own test. Return coupon below for generous trial sample of a Dow Corning SILICONE DEFOAMER. No obligation, of course.



Dow Corning CORPORATION
MIDLAND, MICHIGAN

NAME			3210	My foamer is
TITLE				
COMPANY				
CITY	ZONE	STATE		
Oil system				
Aqueous system				
Food products				
Other				

Check 1607 opposite last page

CHEMICAL MATERIALS



Promising sucrose ester of high molecular weight and compact structure has a multipurpose effect in coating formulations.

Controlled esterification of sucrose with acetic and isobutyric anhydrides has produced a compound whose action is intermediate between resin and plasticizer in coating formulations. Sucrose acetate isobutyrate has excellent stability and wide compatibility with most resins, film formers, and plasticizers. In extending solvent coating, lacquer, and hot melt formulations, there is no increase in viscosity and no decrease in film hardness. In some cases film hardness is increased.

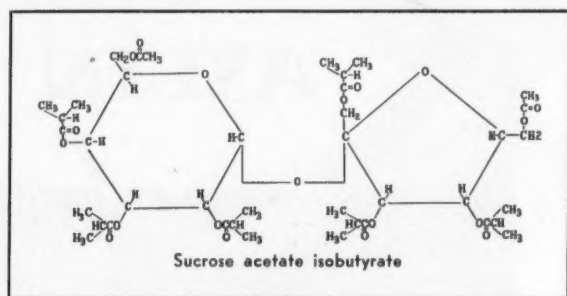
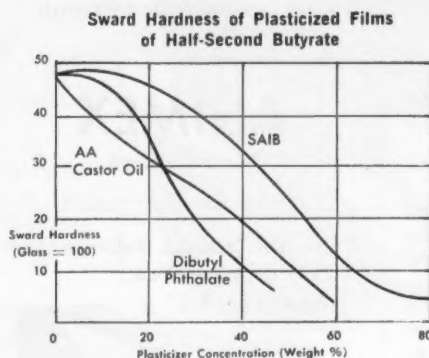
Compound is a clear liquid of high molecular weight (847). Although extremely viscous (100,000 cps @ 30°C) when undiluted, 90 parts in 10 parts of ethyl alcohol form a solution with a viscosity of

only 700 cps at room temperature. It is primarily this alcohol solution that will be marketed with undiluted form also available. Viscosity also decreases markedly with increases in temperature, being 600 cps @ 70°C and 90 cps @ 100°C.

Typical properties (undiluted)

Refractive index, n_D^{20}	1.4616
Specific gravity, 25/25	1.146
Solubility, % (H ₂ O @ 25°C)	0.1
Color stability	
(Gardner color) original	1
after 24 hr @ 350°F	3
after 48 hr @ 350°F	6
after 144 hr @ 350°F	10
Flash pt (COC), °F approx	500

Extreme solubility of sucrose acetate isobutyrate is indicated by greatly reduced viscosity from undiluted (right 100,000 cps) to dilution with 10 parts of ethyl alcohol (left 700 cps)



Extender for film formers maintains best properties

Sucrose acetate isobutyrate, SAIB, has been evaluated in wood lacquers, paper coatings, cloth coatings, metal lacquers, plastic lacquers, hot melt coatings, and peelable plastic coatings.

In wood lacquers, low solution viscosity permits a higher non-volatile content without exceeding application viscosities. Films show good adhesion, resistance to spotting and softening by hot water and alcohol.

Paper coatings have exhibited very high gloss, good adhesion, hardness, and scuff resistance. Gravure paper lacquers with over 30% non-volatile content at application viscosity have been prepared. Cloth coating lacquers modified with SAIB have been

evaluated with over 32% solids content at application viscosity. They exhibited good toughness and low temperature flexibility.

Because of its high thermal stability and low volatility, this sucrose ester is particularly useful in applications where a high temperature exists. Hydrolysis stability — less than 0.35% hydrolyzed after refluxing in water for 4 days. Electrical properties are equivalent to those of many plasticizers used in surface coatings designed for electrical insulation.

(SAIB is a product of Eastman Chemical Products, Inc., subs Eastman Kodak Co., Kingsport, Tenn.)

Check 1608 opposite last page.

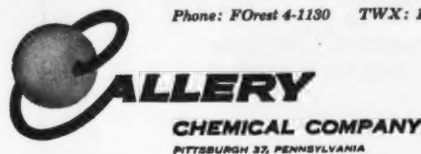
... a spontaneously flammable liquid organoboron compound, useful as a catalytic polymerization agent for ethylenic-vinyl-acrylic monomers—

TRIETHYLBORANE

Triethylborane, $(C_2H_5)_3B$, is a colorless liquid, miscible with most organic solvents. Available now in experimental quantities, Triethylborane is a Lewis acid and forms complexes with ammonia and amines.

Spontaneously flammable, its vapors ignite in oxygen at partial pressures below 1 mm. at $0^\circ C$. Suggested uses include: as a polymerization catalyst; as an igniter; as a jet fuel or fuel component because of its unusual combustion properties. Other alkyl boranes can be made. If you expect that a particular compound might interest you, we would like to hear from you. For more information on Triethylborane, write for Technical Bulletin C-310.

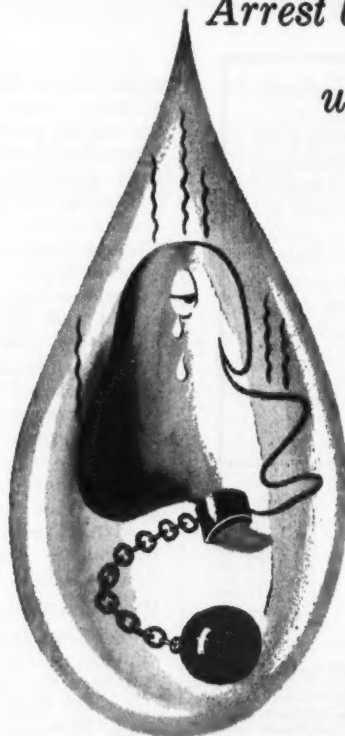
Phone: FOrest 4-1130 TWX: 117 Perryville, Pa.



Check 1609 opposite last page

Arrest bad odors...

use **SINDAR'S
DEODALL®**



The elimination of unpleasant odor is an important concept of modern merchandising, whether the product is a consumer paint or varnish or an industrial material such as a cutting oil, solvent or fertilizer.

You can assure complete freedom from unpleasant odors by using Sindar's multipurpose masking agents in your product.

A description of the material and any pertinent production data will help our specialists select the right Deodall for your use.

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Industrial Aromatics and Chemicals

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Check 1610 opposite last page

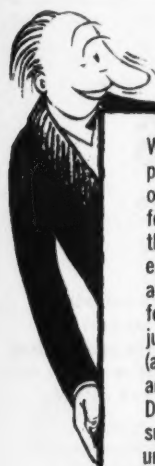
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Julius R. Jensen, Director
OREGON Department of
Planning and Development
721A State Office Building
Portland 1, Oregon
CApitol 6-2161

Check 1611 opposite last page



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WHEN you deal with FRITZSCHE, you deal with pioneers—pioneers in the investigation, development and application of industrial odorants for many different fields. FRITZSCHE offers you the facilities of its laboratories and the experience of its staff specialists for the study of any odor problem you may care to submit for consideration. The procedure is simple: just send them details of your odor problem (along with samples of your products, if any are involved). FRITZSCHE'S Industrial Odorant Division will then study it and submit practical suggestions for its elimination or control. And unless these prove entirely satisfactory, no obligation will be incurred.

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Check 1612 opposite last page

CHEMICAL MATERIALS

**Excellent drawdown
of coating resin
cuts waste**

Results in lower weights and increased economy

Uses: As coating resin for paper, cellophane, and foil.

Features: Lower coating waste and increased economy result from good drawdown characteristics of material.

Description: Polyethylene extrusion coating resin has been applied with comparatively good adhesion in thicknesses of 0.2 mils. It has been run experimentally down to 0.1 mil. Use of resin gives decreased neck-in and consequent decrease in beaded edge. This means less trimming and waste.

(Polyethylene 610M is product of The Dow Chemical Co., Midland, Mich.)

Check 1613 opposite last page.

**Release agent permits
immediate decorating
of molded plastic**

May increase output

A new type of mold release agent for injection molded plastics, designed specifically for use on plastic parts to be decorated, has been developed. Chief advantage of the product is that it permits decorating of molded plastic items without further preparation.

According to reports, use of the release agent has increased output from 200 to 300 percent on many injection molding machines handling difficult jobs. Increased output is partly due from ease with which parts are removed from molds, and partly from the unusually large number of cycles possible between applications.

A mild rust preventative, the release agent has shown that it helps keep injection molds in good condition.

(RelesaGen H-15-1 is development of Central Research Laboratories, General Mills, Inc., 2010 East Hennepin Avenue, Minneapolis 13, Minn.)

Check 1614 opposite last page.

LACTIC CASEIN

Granulation:

30, 60 and 90 mesh

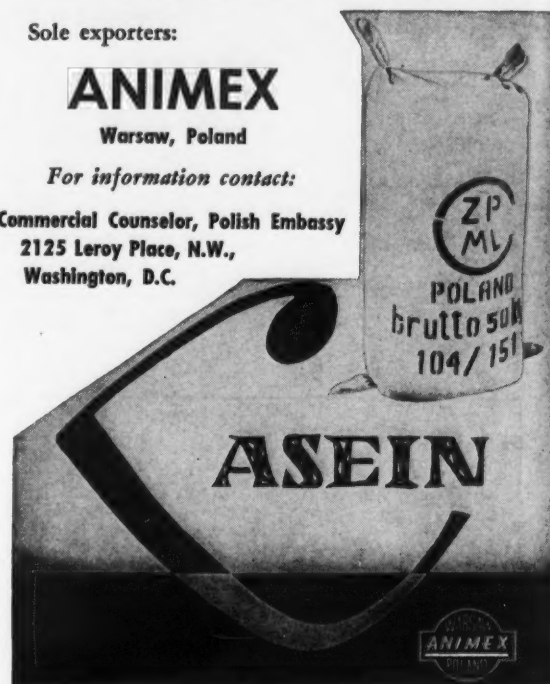
Sole exporters:

ANIMEX

Warsaw, Poland

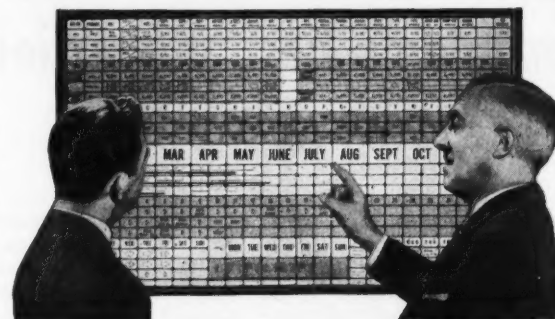
For information contact:

Commercial Counselor, Polish Embassy
2125 Leroy Place, N.W.,
Washington, D.C.



Check 1615 opposite last page

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Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

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NEW YORK 36, N. Y.

Check 1616 opposite last page

CHEMICAL PROCESSING

CHEMICAL MATERIALS

Chloranilic acid and derivatives offered

Other spectrophotometric items added to list

A number of spectrophotometric chemicals have been added to manufacturer's listing. Among these are chloranilic acid and three of its important salts.

Barium Chloranilate used for spectrophotometric determination of sulfates.

Mercuric Chloranilate used for spectrophotometric determination of chlorides.

Strontium Chloranilate is for spectrophotometric determination of fluorides.

Acetone Dimethyl Acetal for drying samples prior to analysis.

(Chloranilic acid, Barium, Mercuric, and Strontium Chloranilate, and Acetone Dimethyl Acetal are products of Matheson Coleman & Bell Div. of The Matheson Co., Inc., Norwood, Ohio.)

Check 1617 opposite last page.

Novel halogen carrier has both positive bromine, chlorine

Uses: A halogen carrier to introduce hydantoin ring as well as bromine and chlorine into unsaturated chains.

Features: Compound contains both positive bromine and chlorine.

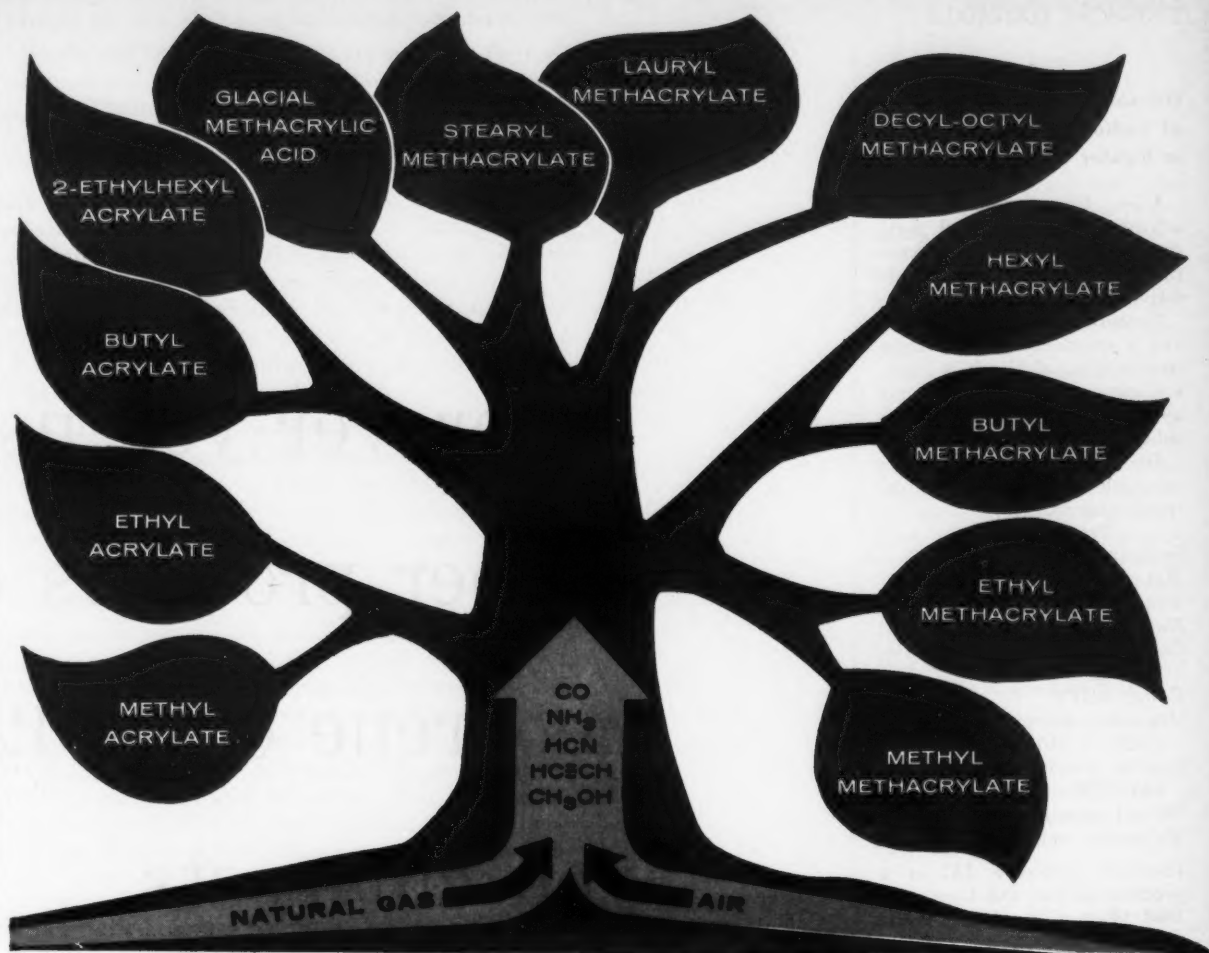
Description: N-bromo-N-chloro-dimethyl hydantoin, trade-named Dihalo, is a free-flowing white powder.

(Dihalo is a product of Bromine Producers Co., 1214 E. Church St., Adrian, Mich.)

Check 1618 opposite last page.

GOING TO THE PAINT SHOW?

If you're going to the Paint Show in Cleveland, October 6-8 or just want a review of "what's new" be sure to see **CHEMICAL PROCESSING'S** Paint Show Preview, page 36.



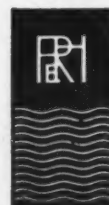
ROHM & HAAS ACRYLIC MONOMERS

Basic raw materials and production initiative give low-cost monomers

Over 25 years ago, Rohm & Haas pioneered the commercial production of acrylates and methacrylates, and since then has led in acrylic research and process development. To increase the availability of acrylics and to lower their cost, we developed economical processes for the syntheses of the monomers and made multi-million dollar investments in plant facilities in Houston, Texas to derive from natural gas and air many of the necessary intermediates—carbon monoxide, ammonia, hydrogen cyanide, acetylene, and methanol.

How does this benefit you? Our long experience can help you in the transportation, storage, and handling of these monomers. Also, prices have been dropped—in the case of ethyl acrylate, from 49c to 34c per pound in the last 5 years. Furthermore, Rohm & Haas offers the widest selec-

tion of commercially available acrylic monomers, plus many acrylic monomers available in development quantities. You can polymerize these monomers, copolymerize them with a large number of other monomers, or use them as intermediates in reactions other than polymerization. For complete information about Rohm & Haas acrylic monomers, write to Dept. SP.



Chemicals for Industry

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries.

Check 1619 opposite last page

**Oil-soluble sulfonate
of sodium available
in lighter color**

Uses: Compounding emulsifying, dispersing, and wetting agents; rust and corrosion inhibitors; various oil additives.

Features: Sodium sulfonate has a maximum ASTM color specification of 3½. It is lighter colored than previously available material and is oil soluble.

Description: Material is available in tankcar and tank-truck quantities.

Typical Analysis

Sulfonate, % by wt	62
Mineral oil, % by wt	34.4
Water, % by wt	3.5
NaOH, % by wt	Neutral
Color, max (ASTM dilute)	3½
Color, ASTM	7
Viscosity, approx (SUS at 210°F)	1200
Specific gravity (60/60°F)	1.03
Wt/gal, approx	8.6
Molecular weight	445

(Sodium sulfonate LC is a product of Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pennsylvania.)

Check 1620 opposite last page.

**Heat-reactive phenolic
makes heat-resisting
neoprene adhesive**

Resin dries quickly in air with outstanding cohesion

Uses: Resin was developed for use in solvent-type neoprene adhesives.

Features: Material is heat reactive and makes possible the production of adhesives with high heat resistance.

Description: Phenolic resin is soluble in aromatic, aliphatic, and ketone solvents. It is compatible with both neoprene and nitrile rubber. It is produced in lump form and has a melting point of 145-165°F.

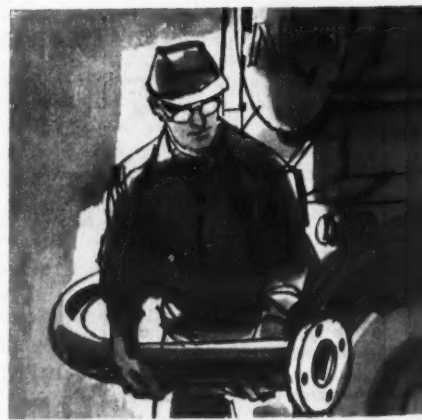
(Phenolic resin SP-126 is a product of Schenectady Resins Div., Schenectady Varnish Co., Inc., Schenectady, N.Y.)

Check 1621 opposite last page.

Wherever you use
rubber products of
neoprene or HYPALON®
you cut costs



Conveyor belts of neoprene or HYPALON often keep rolling twice as long as ordinary belts, even though exposed to chemicals and hot materials which quickly destroy ordinary rubber.



Acid hose gives longer service when it is lined with HYPALON for strong oxidizing chemicals or with neoprene for other chemicals. As covers, both resist wear and weather.

You get longer service life . . . reduced maintenance costs . . . and less downtime. In chemical applications, there's a double benefit in the unique properties of Du Pont neoprene and HYPALON. Whether they are used in acid hose, conveyor belting, gasketing, tank lining or safety clothing, they do a better job and cut costs while they are doing it.

Results speak for themselves. Neoprene lining in a hot acid fumes scrubber stopped costly shutdowns during the production of critical lithium hydroxide and carbonate. In soda ash storage tanks, submerged neoprene check valves, exposed to 265°F. steam, have been used since 1955 with practically no maintenance. Neoprene—offering resistance to oil, grease, abrasion and flexing—is capable of withstanding more deteriorating influences than any other rubber.

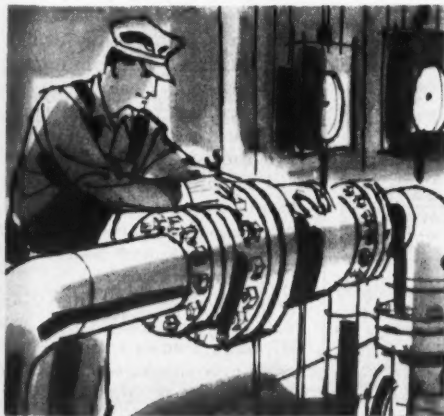
HYPALON, a new Du Pont synthetic rubber, gives products still greater resistance in specialized conditions. For instance, HYPALON seals on an acid fume condenser have been exposed to Aqua Regia, chlorine, nitric oxide, nitrogen dioxide, and nitrogen tetroxide since 1956 without signs of deterioration. HYPALON also has excellent resistance to ozone, oxidation-aging, abrasion and high temperatures.

Rubber products which offer you the longer-term economy of neoprene and HYPALON are available through your local rubber goods distributor. He can suggest the right product for your applications and offer quick delivery on small or large orders. Take advantage of his convenient service by calling him soon. For more information about the properties and many industrial uses of Du Pont neoprene and HYPALON, write for *Du Pont Elastomers in Industry* to: E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Dept. CP-10, Wilmington 98, Delaware.

DuPont synthetic rubbers do more things better . . .
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Gasketing of Du Pont neoprene and HYPALON resists chemical attack and compression set . . . keeping joints tighter longer. Under extreme conditions it holds up where others fail.

Neoprene safety clothing allows freedom of movement while giving the wearer long-lasting, positive protection against chemicals and acids, and even hot oils.



Check 1622 opposite last page

CHEMICAL MATERIALS

Non-toxic stabilizer accepted by USFDA for PVC with food

Uses: As a stabilizer for polyvinyl chloride food packaging materials.

Features: Non-toxic stabilizer has been accepted by U.S. Food and Drug Administration for use in food packaging materials.

Description: Stabilizer, Ferro 707X, is a white paste compound with a specific gravity of 1.00 and a bulking value of 0.175 gal/lb. Recommended concentrations are 1.0-2.0 parts per hundred resin. It may be used in operating temperatures of 365°F to 385°F. Both clear and pigmented formulations are possible.

(Ferro 763 PVC stabilizer is a product of Ferro Corp., 4150 East 56 St., Cleveland 5, Ohio.)

Check 1623 opposite last page.

Reactive bifunctional 2-aminobenzenethiol now offered

Highly reactive, bifunctional aromatic, 2-aminobenzenethiol is now available. Compound undergoes reactions typical of amino and mercapto groups. When reaction occurs at both groups, cyclic thiazole or thiazine derivatives are formed.

A colorless liquid, 2-aminobenzenethiol boils at 227.2°C and solidifies at 23.0°C.

Compound can be reduced, alkylated, acylated, and diazotized. It reacts with hydroxy compounds to form a variety of dyes. Reaction with aldehydes yields benzothiazolines which oxidize in air to benzenethiazoles.

(2-Aminobenzenethiol is available from American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y.)

Check 1624 opposite last page.

Organic chemicals, more than 3700 of them, are listed in 232-page catalog. The majority listed are synthesized or purified in manufacturer's laboratory. List 41—Distillation Products Industries, Eastman Kodak Company, Rochester 3, New York.

Check 1625 opposite last page.

**No more wet soiling
with this softener
for textiles**

Other properties equal to or better than most

Uses: Silicone emulsion is designed specifically for softening thermosetting textile finishes.

Features: Product possesses two important properties not available in other durable softeners. It has outstanding resistance to wet soiling (re-deposition of soil) and improved release of soil during laundering. In addition, it offers the established advantages of durable softeners.

Description: Product is a milky white aqueous emulsion with 30% active solids. It is not a textile water repellent.

Typical Properties

Specific Gravity	1.0
pH	7.0
Odor	None

Solubility: Disperses readily in hard water. **Compatibility:** Excellent with all cationic, anionic, and non-ionic finishing materials.

(Silicone textile softener XLE-48 is available from Silicones Div., Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.)

Check 1627 opposite last page.

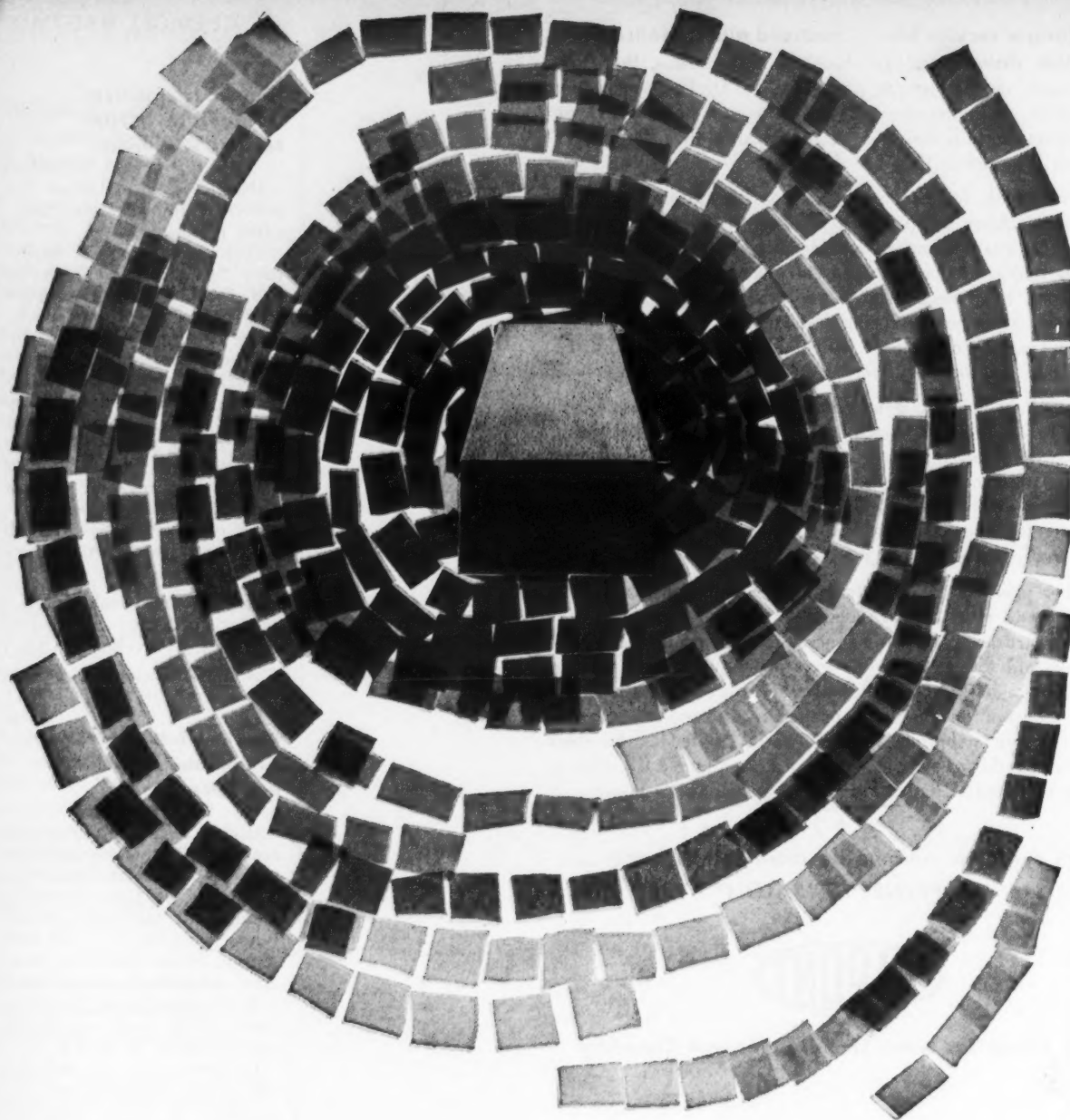
**High purity eases use of
solid epoxies for coatings,
laminates**

Resins do not need filtering and have good clarity

Uses: Coatings for drums, tankcars, and industrial maintenance. Resins can be used in glass reinforced laminates and adhesives.

Features: Purity of epoxies will enable processors to use dissolved resin without filtering. This should result in decreased costs and more uniform performance.

Description: Solid epoxy resins, D.E.R. 661, 664, and 667, have a color rating of one maximum compared to ratings that range as high as eight maximum for conventional products. Sodium content is



mix imagination with Alcoa Aluminas

and get refractories or refractory castables that work hardest, longest! Refractories are vital to production in almost every industry. To give industry the best refractories possible, more and more refractory manufacturers have turned to Alcoa® Aluminas. They've found that refractoriness and durability increase in direct proportion to the amount of alumina they use. They know it pays to mix imagination and engineering with Alcoa Aluminas . . . for the best in refractory performance at reasonable cost.

Alcoa is not a source for finished refractories, but does supply aluminas to manufacturers of the best refractories. For their names, write: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-K Alcoa Building, Pittsburgh 19, Pennsylvania.

For finer products . . . let Alcoa add new dimension to your creative thinking!



ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings

Check 1626 opposite last page

CHEMICAL MATERIALS

low for better electrical and coating performance. Low-molecular-weight 661 is for catalytically cured coatings; one-component 664 is useful in ester systems and needs no curing agent; catalytically cured 667 requires high baking temperatures and gives maximum flexibility and toughness.

(Epoxy resins D.E.R. 661, 664, and 667 are product of Dow Chemical Co., Midland, Mich.)

Check 1628 opposite last page.

This primary plasticizer gives PVC excellent low-temp flexing

DNODA offers good balance of properties

Uses: Primary plasticizer for polyvinyl chloride.

Features: Imparts excellent low-temperature flexibility and efficiency along with softness, superior "hand" and "drape", permanence, water resistance, and heat and light stability. Ideally suited for film, sheeting, and coated fabrics, product also imparts extended shelf life to vinyl dispersions and plastisols.

Description: Plasticizer DNODA, di(n-octyl, n-decyl) adipate, is priced at \$0.40/lb in tank car and tank truck quantities. In addition to PVC and chloride acetate copolymers, product can also be used with nitrocellulose, ethyl cellulose, chlorinated rubber, GRS and Buna N, polyvinyl butyral, cellulose acetate butyrate, polystyrene, methacrylate, and dammar.

(DNODA plasticizer is a product of Monsanto Chemical Co., St. Louis 24, Mo.)

Check 1629 opposite last page.

Calcium cyanamide — Booklet of 60 pages shows how cyanamide's unique properties permit it to join cooperatively with other chemicals in many ways. It is designed to stimulate new independent research efforts. Calcium Cyanamide Booklet — Manufacturer's Chemicals Department, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.

Check 1630 opposite last page.

OCTOBER 1958



3 TIMES MORE CARBONATE IN SOLUTION*!

To get **MORE** carbonate in solution... To get **GREATER** reactivity...**USE— SOLVAY POTASSIUM CARBONATE**

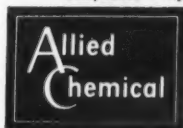
SOLVAY Potassium Carbonate is more soluble and has greater reactivity than sodium carbonate (soda ash). This permits the use and packing of more efficient, more concentrated solutions... with savings in handling, storage and packaging. The greater reactivity of the product means better results in many uses.

These dual advantages are being utilized by users and producers of liquid soaps and detergents; producers of special boiler and other cleaning compounds; as well as chemical and textile processors.

*At 68°F.

Write for New Potassium Carbonate Booklet
Features useful facts on physical and chemical properties, reactions, major uses, forms, packages, solubility, etc.

Sodium Nitrite • Calcium Chloride • Chlorine • Caustic Soda • Caustic Potash
Chloroform • Potassium Carbonate • Sodium Bicarbonate • Vinyl Chloride • Methyl
Chloride • Ammonium Chloride • Methylene Chloride • Monochlorobenzene
Soda Ash • Para-dichlorobenzene • Ortho-dichlorobenzene • Carbon Tetrachloride
Ammonium Bicarbonate • Snowflake® Crystals • Aluminum Chloride • Cleaning
Compounds • Hydrogen Peroxide • Mutual Chromium Chemicals



SOLVAY PROCESS DIVISION

61 Broadway, New York 6, N. Y.

SOLVAY branch offices and dealers are located in major centers from coast to coast.

SOLVAY PROCESS DIVISION

61 Broadway, New York 6, N. Y.

DS-10

Please send me without cost:

- ☐ Working sample of SOLVAY Potassium Carbonate
☐ SOLVAY Potassium Carbonate fact book

Name _____

Position _____

Company _____

Phone _____

Address _____

City _____ Zone _____ State _____

Check 1631 opposite last page

B.F. Goodrich Chemical raw materials



6" pipe made from Geon is used to deliver water from cooling tower on ninth floor of the Cherry Plaza Hotel, Orlando, Florida. Scott-Smith Corporation, Miami, was the installation contractor. B.F. Goodrich Chemical Company supplies the Geon rigid vinyl material only.

Contractor tells how pipe of Geon pays off for air conditioning job

When this hotel added air conditioning, lightweight pipe made from Geon rigid vinyl really paid off. The contractor reports that only two men were needed to install the piping. He also reports that solvent cementing the pipe speeded completion of the entire operation far faster than originally expected.

In addition, the contractor expects future advantages because pipe of Geon is not subject to corrosion. Calcium carbonate won't adhere to Geon—eliminating a major cause of friction drop and

pump overloading. Another advantage: savings in friction loss by use of Geon pipe permitted selection of a size smaller than ordinarily specified on jobs like this.

Conduit or pipe made from Geon offers high tensile and impact strength, too. It's another example of the way Geon polyvinyl material can make possible new or improved products. For information, write Dept. LJ-10, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.



GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company

Check 1632 opposite last page

CHEMICAL MATERIALS

Radiation inhibitor protects animals

Uses: As a radiation inhibitor.

Features: Studies in mice have shown the compound to be effective in protecting animals against X-radiation. Uses as an enzyme activator and as a free radical detoxifier have been indicated.

Description: Radiation inhibitor is an odorless, white crystalline powder which melts at 188-192°F. It is soluble in water and methyl alcohol, slightly soluble in ethyl alcohol and isopropyl alcohol, but insoluble in ether, chloroform, and non-polar solvents.

The active protective agent appears to be 2-mercaptoethylguanidine hydrobromide (MEG), to which the inhibitor is quantitatively converted (with the liberation of a free sulfhydryl group) on neutralization to pH 7.0.

Radiation inhibitor AET (2-aminoethylisothiuronium bromide hydrobromide) is available in limited quantities.

(AET Radiation Inhibitor is available from Abbott Laboratories, North Chicago, Ill.)

Check 1633 opposite last page.

Hand, tear strength loss in wash-wear fabrics stopped by softener

Textile-finishing agent has high melting point

Uses: Textile softener.

Features: Agent overcomes loss of hand and tear strength when used in conjunction with thermosetting resins commonly employed in finishing of wash-and-wear garments. Abrasion resistance and crease recovery of fabrics treated are also improved.

Description: Textile-finishing agent is an emulsifiable polyethylene. It has a high melting point which makes it wash-stable and dirt-resistant at normal wash temperatures. It is non-chlorine-retentive, non-nitrogenous, sunlight and scorch resistant.

Softener does not discolor, will not turn rancid on aging.

and does not require curing. Due to lubricant qualities of the low-molecular-weight polyethylene, fibers of fabrics treated slide aside, permitting needles of high-speed machines to sew between, instead of through, the fibers.

(A-C Polyethylene 629 is available from Semet-Solvay Petrochemical Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.)

Check 1634 opposite last page.

Versatile corn protein dispersed in water by weak alkalis

Product produces hard, tough, grease-resistant films

Uses: For formulating rubber-floor polishes, water-based inks, leather finishes, grease-resistant coatings for paper, and other products.

Features: Material can be effectively dispersed in water by weak alkalis. It produces hard, tough, grease-resistant films that are non-thermo-plastic.

Description: Product is a protein obtained commercially by extraction from corn gluten. It is a member of the prolamine protein group which are soluble in aqueous alcohols but insoluble in water. Previously, strong alkalis with a pH of 11 or higher have been required to get a water dispersion of this corn protein.

(Zein G210 is product of Corn Products Refining Co., Argo, Illinois.)

Check 1635 opposite last page.

Dimethyl acetamide data sheet suggests use as solvent for synthetic resins and foam depressor for mineral oils containing phosphorous acids as anti-oxidants. **Allyl ester** data sheet includes line of allyl esters of monocarboxylic acids and diallyl esters of dibasic acids. Listing includes compounds having unusual combinations of functional groups within same molecule. Monomer-Polymer Laboratories, The Borden Chemical Company, 5000 Langdon St., Philadelphia 24, Pa.

Check 1636 opposite last page.

Send today for this useful data on WHITE OILS prepared to fit your specific needs

PHARMACEUTICAL OINTMENTS—WHITE MINERAL OILS FOR

Products: BLANDOL and ERYOL WHITE MINERAL OILS, U.S.P. LIGHT; PROTOL, GLOBA and KAYDOL WHITE MINERAL OILS, U.S.P. HEAVY

Pharmaceutical Ointments:

In general, white or yellow petroleum, U.S.P., is the base for pharmaceutical ointments. (See Technical Data File 1-202.) However, in certain cases in which a large quantity of solid ingredients is present and when a softer consistency or a greater degree of emulsibility is desired, white mineral oil is employed as an ingredient.

Oils Recommended:

BLANDOL and ERYOL White Mineral Oils, U.S.P. Light, as well as PROTOL, GLOBA and KAYDOL White Mineral Oils, U.S.P. Heavy, are suggested for incorporation in pharmaceutical ointments where a softer consistency or a greater degree of emulsibility is desired. An ointment containing a white mineral oil is able to accommodate a large quantity of solid ingredients and still have a relatively soft consistency.

PROPERTY	BLANDOL	ERYOL	PROTOL	GLOBA	KAYDOL
Specific Gravity @ 60°F.	0.875	0.875	0.875	0.875	0.875
Refractive Index @ 20°C.	1.465	1.465	1.465	1.465	1.465
Flash Point	250°F.	250°F.	250°F.	250°F.	250°F.
Fire Point	270°F.	270°F.	270°F.	270°F.	270°F.
Viscosity @ 100°F.	100 cS	100 cS	100 cS	100 cS	100 cS

Properties Essential for the Purpose

BLANDOL and ERYOL White Mineral Oils, U.S.P. Light, as well as PROTOL, GLOBA and KAYDOL White Mineral Oils, U.S.P. Heavy, are suggested for incorporation in pharmaceutical ointments where a softer consistency or a greater degree of emulsibility is desired. An ointment containing a white mineral oil is able to accommodate a large quantity of solid ingredients and still have a relatively soft consistency.

Gives complete information on properties and characteristics of the White Mineral Oil best suited for utilization in each application or process listed below. Also suggested formulations.

Check Coupon Below for Data on WHITE OILS for Use in These Applications

- | | | |
|-------------------------------|---|--|
| 1. Alkali Dispersions | 13. Hair Preparations* | 25. Pharmaceutical Ointments |
| 2. Apple Wrap | 14. Hydraulic Machines | 26. Plastics |
| 3. Baby Oil | 15. Industrial Dust Control | 27. Plastic Skin |
| 4. Bowling Alley Compounds | 16. Intestinal Lubricants | 28. Slab Dressing for Confectionery Industry |
| 5. Canning Industry | 17. Laundry—Ironer Oil | 29. Sterilization of Medical Instruments |
| 6. Cattle Sprays | 18. Leather Industry | 30. Summer Spray Emulsions |
| 7. Corn Earworm Control | 19. Macaroni Manufacture | 31. Sweeping Compounds |
| 8. Cosmetic Creams | 20. Meat Packing | 32. Tobacco Sucker Control |
| 9. Cottrell Precipitators | 21. Mineral Feeds | 33. Tracing Paper |
| 10. Dutch Elm Disease Control | 22. Oil Filled Capacitors | 34. Upper Motor Lubrication |
| 11. Electrical Industry | 23. Paper Impregnation (Carrier for Polyethylene) | 35. Veterinary Ointments and Medications |
| 12. Food Processing | 24. Petrochemicals from Ethylene | |

*Including Dutch Cream or Hair Stick

Sonneborn

L. SONNEBORN SONS, INC.
New York 10, N. Y.

Specialists in White Oil and Petrolatums for More than Half a Century

White Oil, Petrolatum & Sulfonate Div., Dept. 2-03
L. SONNEBORN SONS, INC.,
300 Fourth Avenue, New York 10, N. Y.

Please send me the Technical Data indicated below (circle number corresponding to application in list above).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

Name..... Title.....
Company.....
Address.....
City..... Zone..... State.....

Check 1637 opposite last page

HOW **HERCULES** HELPS...

create
new
concepts
in
packaging
with
hi-fax®



Breck gets superior plastic packaging at no extra cost with this handsome, practical and durable Hi-fax bottle.

Hi-fax, Hercules high-density polyethylene, made possible this dramatic breakthrough in plastic "carrier" packages. This Hi-fax container for Breck Banish is featherlight, unbreakable, handsomely decorated by offset printing . . . a truly modern, low-cost package for a modern new beauty product.

Plax Corporation, Hartford, Conn., producer of the new Banish bottle, now offers packagers a complete line of stock Hi-fax containers ranging in size from 32 ounces to 6 ounces. Only 1/8 the weight of glass, yet competitive

in cost, these modernistic containers provide a combination of advantages possible only with Hi-fax—shatter-proof toughness, heat resistance which permits post-packaging sterilization, and resistance to stress corrosion cracking. Hi-fax bottles can be safely packed and shipped in economical, lightweight containers, provide substantial savings in freight costs.

Whether you make containers or use them, why not write to Hercules for more information about how Hi-fax can help to give your product a new look.

Plax Corporation offers many opportunities for Hi-fax packages in a selection of stock and custom sizes.



Check 1638 opposite last page



HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

HERCULES

CHEMICAL MATERIALS

Difunctional compounds give better reactivity and solubility

Outdo corresponding acids
in many organic solvents

Uses: As raw materials for synthetic fibers, films, and protective coatings.

Features: Products exhibit greater reactivity as well as greater solubility in many organic solvents, as compared with corresponding acids.

Description: Difunctional compounds, isophthaloyl chloride and terephthaloyl chloride, are supplied as white solids. The tentative specifications for each phthaloyl chloride show a minimum purity of 98%.

(Isophthaloyl chloride and terephthaloyl chloride are available in pilot-plant quantities from Hooker Chemical Corporation, Box 344, Niagara Falls, N.Y.)

Check 1639 opposite last page.

Produce urethane foam with low compression set values

Uses: For urethane-foam manufacture.

Features: Products produce urethane foams with good physical properties including low compression set values.

Description: Catalysts are long-chain fatty tertiary amines. They are characterized by high activity (over 95% tertiary amine), high purity, and the absence or low level of odor.

(Sipene amine catalysts are products of American Alcolac Corporation, 3440 Fairfield Rd., Baltimore, Md.)

Check 1640 opposite last page.

"Cobalt and its Alloys", a revised 125-page bibliography, presents a summary of allotropic and phase diagrams. Bound edition contains more than 900 references to binary, ternary, and quaternary systems. "Cobalt and its Alloys" may be obtained by letterhead request to Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Avenue, Columbus 1, Ohio.

CHEMICAL PROCESSING

**Latex resists foaming
and has excellent
water resistance**

Product is characterized by
uniform particle size

Uses: Latex is for use in
water-base paints. It can be
used alone or in combination
with other film formers.

Features: Product exhibits
remarkable resistance to foam-
ing and excellent water re-
sistance. It is characterized by
an extremely uniform particle
size. A typical analysis by
photomicrography shows par-
ticle size to be 0.200 micron
with a variation of only plus
or minus 0.003 micron.

Description: Formulation is
a stable water dispersion of a
styrene-butadiene copolymer
fortified during polymeriza-
tion. It is compatible with
long-oil alkyds, proteinaceous
or cellulosic water-soluble
resins, or conventional, sty-
rene-butadiene latices.

(Dylex latex K-31 is a prod-
uct of Plastics Div., Koppers
Company, Inc., Pittsburgh 19,
Pennsylvania.)

Check 1641 opposite last page.

Now in pilot plant are four nitrogen heterocyclics

Potential pharmaceutical,
chemical intermediates

Most recent in a series of
nitrogen compounds available
in pilot plant quantities are
four nitrogen heterocyclics.

N-Butylene Pyrrolidine and
N-Methyl Pyrrolidine show
promise as pharmaceutical and
chemical intermediates.

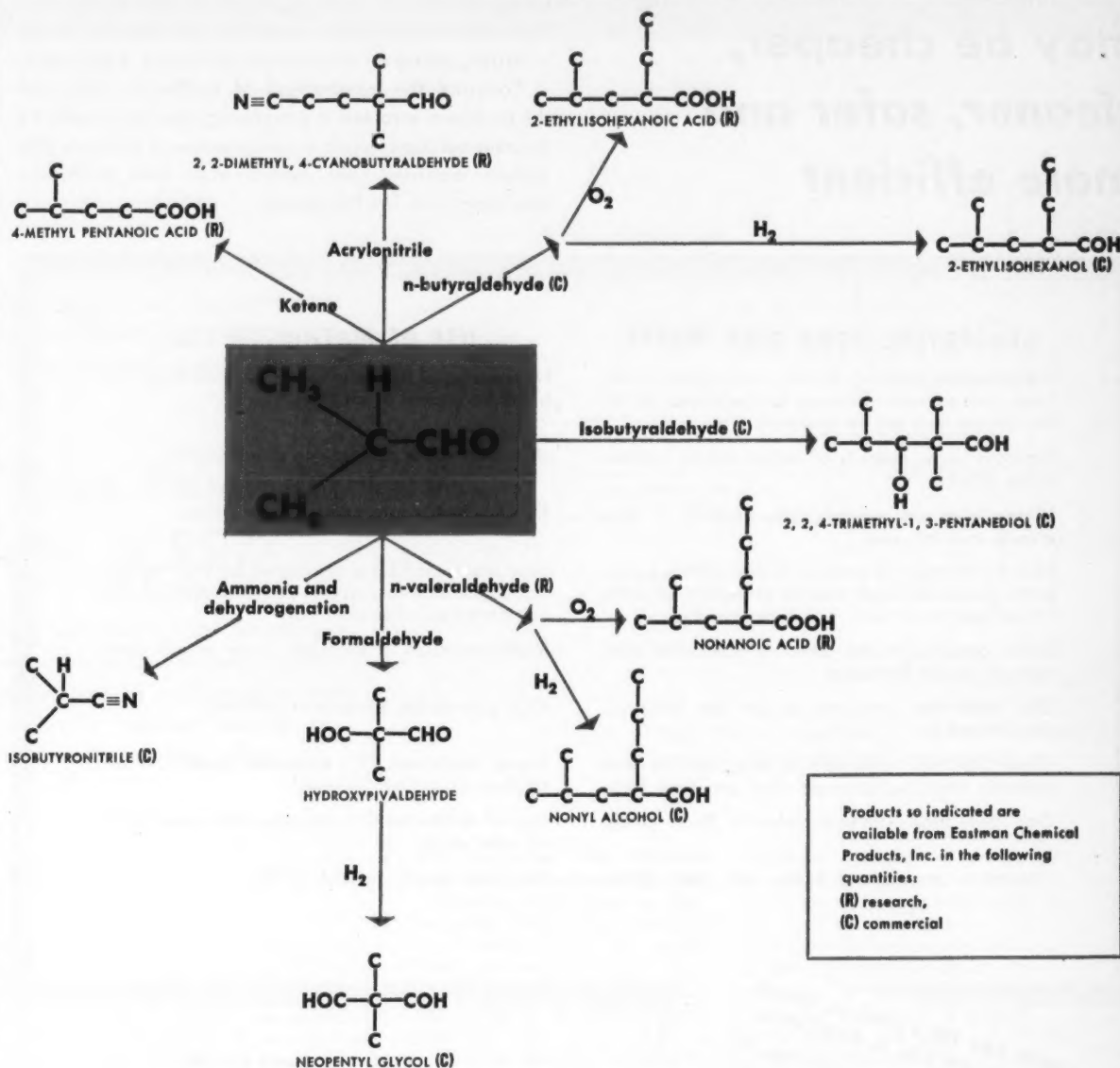
3,5-Dibutyl Pyridine has a
wide temperature range which
suggests possible use as a heat
transfer medium.

3,5-Dimethyl Pyridine can
be readily oxidized to dinico-
tinic acid. It should be useful
as a solvent and organic syn-
thesis.

(For more information on ni-
trogen heterocyclics contact
Ansul Chemical Co., Mari-
nette, Wisconsin.)

Check 1642 opposite last page.

For new routes and new products—consider these reactions of ISOBUTYRALDEHYDE a versatile chemical building block



Products so indicated are
available from Eastman Chemical
Products, Inc. in the following
quantities:
(R) research,
(C) commercial

Commercially available in tank car quantities, Eastman isobutyraldehyde is one of the chemical industry's newest building blocks.

The reactions indicated here have been selected from among many as receiving the greatest amount of attention since the introduction of isobutyraldehyde as a basic raw material.

Useful in themselves or as intermediates, these derivatives of isobutyraldehyde are becoming increasingly important as a source of solvents, plasticizers, pharmaceuticals, polymers, resins, insecticides, hydraulic fluids and lubricants.

Samples of isobutyraldehyde and of those derivatives so indicated are available for your evaluation. Write to us at Kingsport, Tennessee or contact our nearest sales representative.

Eastman

CHEMICAL PRODUCTS, INC.

KINGSPORT, TENNESSEE

subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Check 1643 opposite last page

Do you generate your own inert gases?

Using Mathieson CO₂ may be cheaper, cleaner, safer and more efficient

GENERATING YOUR OWN INERTS

Unless precise metering of fuel is maintained at all times, carbon monoxide may be produced, or all the oxygen may not be consumed.

Produces large amounts of water vapor, necessitating driers.

Where inert gases are needed under pressure, a compressor must be used.

Reserve storage is a problem in case of stoppages in the generator. Small amounts of generated inert gases can be stored, but only as a compressed gas.

Sulfur compounds and other contaminants may appear, due to fuel used.

Gas generators are slow to get into action... very inflexible.

Generators are expensive to buy, operate and maintain while replacement costs are very high.

Gas generators consume valuable floor space.

Operation may create fumes, dirt, toxic gases.

Carbon dioxide's wide range of inerting applications are only beginning to be utilized. Although it cannot be used in all inerting applications, CO₂ is nonetheless finding a steadily increasing market where elemental inert gases—argon, nitrogen, etc.—have previously been used.

Compare the advantages of Mathieson CO₂ with the problems involved in generating your own inert gases by burning out the oxygen in air to arrive at nitrogen plus carbon dioxide. Then contact your Olin Mathieson representative for full details.

USE OF MATHIESON CO₂

No metering of fuel required at all. Mathieson CO₂ is uniformly pure at all times.

No water vapor present. No driers needed.

CO₂ has high vapor pressure at all times.

Your supply of CO₂ is unaffected by stoppages in equipment or in fuel supply. Large amounts of CO₂ are stored as a liquefied gas.

Mathieson CO₂ is uniformly pure at all times.

CO₂ is available instantly at all times.

Use of Mathieson CO₂ eliminates generators and all their associated expense.

Use of Mathieson CO₂ requires little floor space or none at all.

No fumes, no dirt, no toxic gases.

HERE ARE THE FORMS IN WHICH MATHIESON CO₂ IS AVAILABLE

Size Storage	CO ₂ Vapor Volume, 100% Basis, 70°F
50 lb. cylinder	440 cu. ft.
150 lb. converter	1,319 cu. ft.
300 lb. converter	2,637 cu. ft.
1,000 lb. converter	8,790 cu. ft.
4 ton receiver	70,320 cu. ft.
6 ton receiver	105,480 cu. ft.
24 ton car*	421,920 cu. ft.
30 ton car*	527,400 cu. ft.

*For direct unloading to your process.



MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS BALTIMORE 3, MD.

HERE ARE SOME OF THE IMPORTANT CHARACTERISTICS OF CO₂ VAPOR

Molecular weight	44.004
Specific Gravity	1.527 (when air equals 1) 1.557 (when N ₂ equals 1)
Absolute density	0.114 lb./cu. ft. @ 70° F.
Thermal conductivity	0.590 (air equals 1)
Specific heat	0.19 to 0.21 BTU/lb.
Volume, cu. ft./lb.	8.79 @ 70° F.
Pressure, saturated	852.5 psia @ 70° F.
Cost, 100 cu. ft.	\$0.455 (CO ₂ costing \$.04/lb.)

CHEMICAL MATERIALS

Wide use range seen for sulfonate detergent

Has high water solubility, good compatibility

Uses: Compound was developed particularly for hard-to-clean applications such as resin and ester kettles, metal surfaces, and chemical glassware.

Features: Sulfonate detergent has exceptional water solubility. It shows excellent compatibility with alkaline and acid detergent builders. It permits formulation of cleaning compounds and detergents having minimum hazing and clouding tendencies.

Description: Detergent is an anionic alkanolamine salt of alkyl aryl sulfonate. A large variety of formulations based on phosphates, silicates, phosphoric acid and other ingredients are possible.

(Emcol P10-49 sulfonate detergent is a product of Emulsol Chemical Corporation, Div. of Witco Chemical Co., 75 E. Wacker Drive, Chicago 1, Ill.)

Check 1645 opposite last page.

Interesting compounds sterically hindered

Pivalic acid and neopentyl alcohol are second and third members of projected series of sterically hindered compounds being made available by manufacturer. Compounds afford pharmaceutical and related industries pilot plant quantities of previously rare chemicals as intermediates which should be of considerable interest.

(Pivalic acid and neopentyl alcohol are products of Arapahoe Chemicals, Inc., 2800 Pearl St., Boulder, Colorado.)

Check 1646 opposite last page.

Chloroacetaldehyde properties, reactions, and uses are discussed in revised technical manual. Chloroacetaldehyde Bul — Technical Service and Development, The Dow Chemical Company, Midland, Mich.

Check 1647 opposite last page.

5980

Check 1644 opposite last page

Aiding in conservation of natural resources,
plant being built in Canada by Texas Gulf Sulphur Co.
and Devon-Palmer Oils Ltd. uses process in which —

Reheating of Gases Raises Recovery of Sulfur to 95.1%

Engineering and economic study of project shows that estimated daily recovery of 370 long tons of sulfur and 11 million cubic feet of natural gas justify required capital expenditures and operating costs

SULFURIC plant now being built in Calgary, Alberta, Canada uses a process whereby a high efficiency of 95.1% of available sulfur will be recovered from sour gas. This high yield is obtained by repeating the process of heating the gases, catalytic conversion, and condensation. Plant is expected to go on stream in April 1959. It will be operated by the Texas Gulf Sulphur Company and Devon-Palmer Oils Ltd.

In a report submitted to the Alberta Oil and Gas Conservation Board, it is shown that the plant will aid in conserving natural resources and will provide valuable products that will amply justify the required capital expenditures and oper-

ating costs of the installation.

Gas will be collected from seven wells with a 42,000', 10"-diameter trunk line, to which are connected 4" lateral lines. Total cost of the gathering system is estimated at \$480,000 while the sulfur plant is estimated to cost \$6,215,700. Hence, total capital cost of system would be \$6,695,700.

At the time project was started, it was estimated that annual operating costs would be as follows: Cost of sour gas would be \$586,000 per year. Operation of gathering system was estimated at \$12,000. Consumable supplies would come to \$128,000. Total labor for operation, maintenance, and staff was estimated at \$305,000. Allowance for benefits, taxes,

and insurance was \$143,000 and for contingencies, \$58,000.

General administrative, advertising, and sales expense was estimated to be about \$2.00 per ton of sulfur produced or \$252,000. Operating costs total up to \$1,484,000 per year.

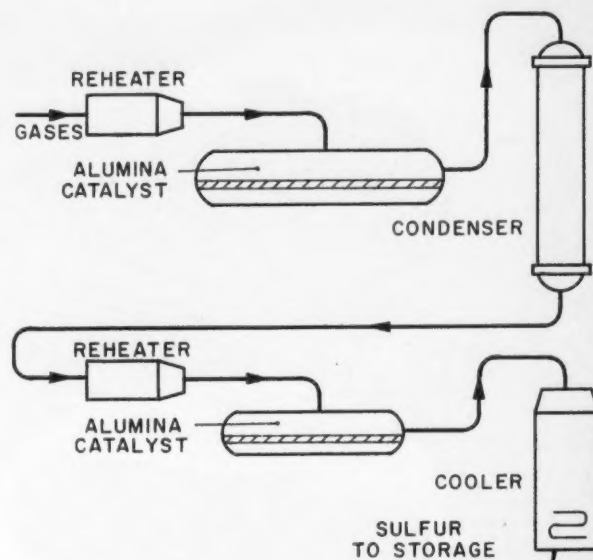
Plant is designed to remove 370 long tons of sulfur per day from a sour gas input of 30 million cu ft per day. Input gas contains 34.5% hydrogen sulfide, 10.7% carbon dioxide, 2.1% nitrogen, and 52.7% methane including traces of other hydrocarbons. Of 16,400,000 cu ft of hydrocarbon gases in feedstock, about 11,000,000 cu ft will be made available for sale. Balance will be consumed in intraplant services and in firing well-head heaters.

Raw sour gas coming from wells will be treated with an

aqueous solution of mono-ethanolamine for extraction of acid gas. Gas sweetening process uses an absorption system in which the amine solution is passed countercurrent to the sour gas in a tray absorber. One pass will produce a sweet hydrocarbon gas with 1 grain or less of H_2S per 100 cu ft. A portion of this sweetened gas will be used in plant. Remainder will be dehydrated and delivered to pipeline of Canadian Western Natural Gas Company Ltd.

Amine solution containing absorbed acid gases will be partially heated by countercurrent exchangers and then discharged into top of stripping towers. Additional heat is supplied by condensing low-pressure steam in indirect heaters and discharging it into base of stripping towers.

To next page



Secret of high yield is repetition of process of reheating, catalytic conversion, and condensation

From preceding page

Regenerated amine solution from towers is passed through the countercurrent exchangers mentioned in previous paragraph in order to transfer a portion of its heat to incoming amine solution. Final cooling of regenerated amine solution is accomplished with air coolers before it is discharged into absorption tower for reuse.

Concentrated acid gas from stripping towers is cooled and passed to sulfur recovery system. First step is combustion of acid gas with a limited volume of air in order to convert a portion of hydrogen sulfide to sulfur dioxide. Other components of gas resulting from combustion are sulfur vapor, water, nitrogen, carbon dioxide, and the residual hydrogen sulfide — all of which pass to a gas cooler.

Cooling the products of combustion condenses the sulfur vapor and removes it from the stream. Remaining components are reheated and passed through a bed containing alumina catalyst. This catalyst aids interaction of hydrogen sulfide with sulfur dioxide to form additional sulfur vapor. Following catalyst chamber, a suitable cooling vessel is again provided to condense and collect the sulfur vapor.

Process of reheating, catalytic conversion, and condensation is repeated in order to improve the efficiency of the recovery system. Following second conversion step, remaining gases are burned at about 1000°F and discharged through stack.

(Plant is being designed and built by Brown & Root, Inc., PO Box 3, Houston 1, Texas.)

Check 1649 opposite last page.

NEXT MONTH

Opportunity in foreign trade that is open to petrochemical producers is covered in an article by T. G. Hughes, president of Oronite Chemical Company and a new company, California Chemical International, Inc. Mr. Hughes traces favorable experience of Oronite — which sells more than 30 petrochemical products in 55 foreign countries.

**CRITICAL
REQUIREMENT:
Round-the-Clock Service
Under Continuous
Pressure**

...at New Instrumented

GENERAL TIRE Synthetic Rubber Plant at Odessa

The nation's first privately financed and first completely integrated synthetic rubber operation owned jointly by The General Tire & Rubber Company and The El Paso Natural Gas Company at Odessa, Texas utilizes 880 instruments for absolute and continuous control by a single operator.

Just 22 months after the agreement was signed between The General Tire & Rubber Company and The El Paso Natural Gas Company, two new plants costing \$32,000,000 went on stream at Odessa, Texas to manufacture GR-S synthetic rubber. Now in full production day and night, a continuous stream of raw materials enters the General Tire plant at one end, leaving the other end as bales of synthetic rubber. The entire manufacturing process demands the utmost care in the control of timing, temperatures, pressures and the proportionate quantities of the various ingredients.

Eighteen pressure vessels fabricated by Graver of ASTM A-285 Grade C flange quality steel are important links in the modern automation chain at the General Tire plant. Built to be in operation around-the-clock under continuous pressure, the 18 pressure vessels are symbolic of the meticulous fabricating craftsmanship Graver applies to processing equipment for the petrochemical, chemical and petroleum industries. Over a century of experience qualifies Graver to tackle the most exacting specifications.

GRAVER

*Building for the Future on
a Century of Craftsmanship
in Steels and Alloys*

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA • New York • Philadelphia
Edge Moor, Delaware • Pittsburgh • Atlanta • Detroit • Chicago
Tulsa • Sand Springs, Oklahoma • Houston • New Orleans
Los Angeles • Fontana, California • San Francisco

Check 1648 opposite last page

PETROCHEMICALS

High-purity butene-2 and butene-1 concentrate in large quantities

Commercial quantities of high-purity butene-2 and butene-1 concentrate have recently been made available. Formerly, butylenes have been commercially available only as mixed isomers, mainly from refinery catalytic cracking operations. These streams contain a large amount of butanes and are mostly utilized in processes where both butylene isomers yield the same product, such as butadiene and sec-butanol. For these uses the high-purity butene-2 stream will aid the processor by virtually eliminating the large amount of nonreactive butanes which his equipment has been required to handle.

Butene-2 is available in 96% minimum concentration, is free of isobutylene, contains less than 0.5% butene-1, and less than 1% butadiene. The remainder is n-butane.

Butene-1 concentrate is 60% minimum butene-1 content. Remainder is essentially butanes except for isobutylene in concentrations up to 5%.

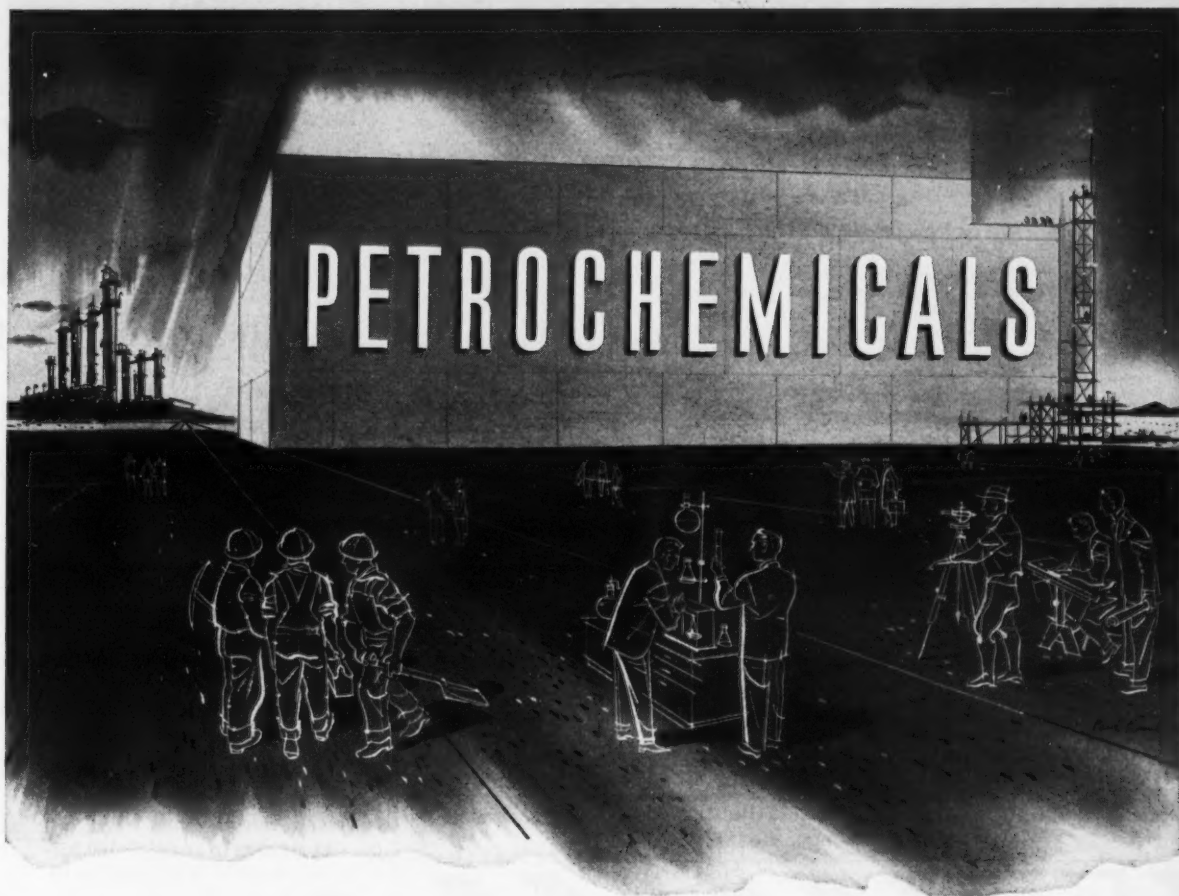
An interesting possibility for the separated n-butylene isomers is their use in reactions where each gives a different product. Mixed butylene feedstocks would yield a mixture of products that might be difficult to separate or, if separated, might not all be marketable. Through use of the separated normal isomers now being made available, the processor can overcome such problems.

(Normal butylene isomers are available from Texas Butadiene & Chemical Corporation, 440 Bank of the Southwest Bldg., Houston 2, Texas.)

Check 1650 opposite last page.

Compressors varying in capacity from 1000 to 12,000 cfm, for pressures to 15 psig, are described in four-page bulletin. Design and construction data on these Spiraxial units are included. Bul LAH-158 — Roots-Connersville Blower, Div. of Dresser Industries Inc., 900 W. Mount St., Connersville, Indiana.

Check 1651 opposite last page.



What it takes to build a new word

If your dictionary isn't the latest copy, chances are you won't find the word "Petrochemical" in it. It only got into the book a year or so ago. But a lot of time, thought and work went into its building. For many years scientists, designers and engineers in the petroleum industry have been developing the techniques for producing these important by-products that today make this word a most important one in our economy. For instance, here at UOP our research and engineering staff have been working for years, actively developing processes which yield valuable petrochemicals from

petroleum raw materials and refinery by-products. Today UOP makes available to all refiners a number of petrochemical processes. These provide chemicals for the synthetics which have become part of our daily lives through their application to so many products now essential to our standard of living. Too, they help improve the economic efficiency of petroleum refining. UOP will be glad to supply, without obligation, individual recommendations for the practical application of its various petrochemical processes to any refining operation, anywhere in the free world.



UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD, DES PLAINES, ILLINOIS, U.S.A.

More Than Forty Years Of Leadership In Petroleum Refining Technology

Check 1652 opposite last page

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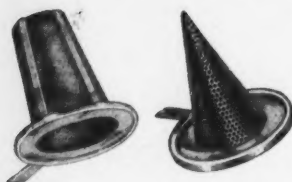
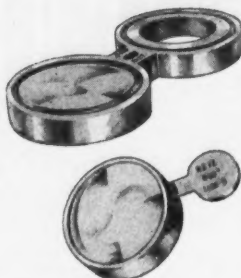


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QUALITY and SERVICE

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Specialists to the Petro-Chemical Engineering Field for many years MAC-IRON is a producer of temporary strainers, spectacle blinds, spade blinds, and allied equipment which incorporate construction principles, design features, and materials that set them apart as the finest obtainable.



You'll want a copy of MAC-IRON Catalog A-7 which presents a complete engineering picture—Descriptions—Specifications—Data. Your request will receive prompt attention. PHONE OR WIRE FOR IMMEDIATE PRODUCTION OR CONSULTATION SERVICE.

**"IF YOU USE PUMPS
You need MAC-IRON Strainers"**

THE MACK IRON WORKS COMPANY

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Check 1653 opposite last page

Designed for Service!



TOWER PACKINGS

KNOX manufactures tower packings from the same composition as is used in our high voltage electric porcelain. This assures you the utmost in Quality at minimum cost.

- KNOX Tower Packings resist high temperatures, fumes, vapor, corrosion.
- Resistant to alkalis, acids, liquids.
- Complete vitrification firing provides zero porosity, assuring indefinite life chemically
- Uniform quality, high chemical purity, iron free, great mechanical strength, will not crumble.

Know your source. Buy direct from KNOX. A wide range of designs, plus modern production methods, gives you a Better Tower Packing.

On special porcelain items send samples or drawings for quotations.

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Specify*



*Tower
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CORPORATION**

KNOXVILLE 1, TENNESSEE



Raschig
Ring



Single-Partition
Ring



Cross-Partition
Ring



Berl
Saddle



Tellerette

Check 1654 opposite last page

PETROCHEMICALS

When spent-acid piping at Continental Oil Co.'s petrochemical plant needed replacing, cost-conscious management broke from conventional methods. As a result . . .

Corrosive Acid Mixture Handled by PVC Pipe at 1/3 Cost

THEODORE W. WETT, Associate Editor
with **J. H. McGINNIS**, Assistant Superintendent
Continental Oil Company, Petrochemicals Department
Chicago, Illinois

Problem: Mixture of sulfuric and sulfonic acid is extremely corrosive. At Continental Oil Company's petrochemical plant in Chicago, corrosion-resistant metal piping handling this mixture had a normal service life of approximately three years. Piping had a relatively high cost and replacement involved considerable labor.

At Continental, 100.5% H₂SO₄ is used in sulfonation to produce an alkyl aryl sulfonate for synthetic detergents. Spent acid at 78-80%, containing dodecylbenzene sulfonic acid, is pumped to settling tanks. Mixed acid is at a temperature of 130-135°F.

Solution: In late fall of 1956, when 500 to 600 feet of pipe needed replacing, Continental decided to try a different piping system. Pipe fabricated from rigid, unplasticized poly-

vinyl chloride was used. Both flanged and solvent welded connections were employed in joining sections.

Results: Entire line was installed in one afternoon, a considerable saving in time and labor over piping material formerly used. Work was handled by regular crews since no special training or instruction was required.

Cost of materials was approximately 1/3 that of previously used system. After about a year and a half of service piping is still in excellent condition. No sign of deterioration is in evidence and no maintenance has been required.

(PVC pipe is a product of National Tube Div., U.S. Steel Co., 525 William Penn Place, Pittsburgh 19, Pennsylvania.)

Check 1655 opposite last page.



Operator indicates
PVC pipe carrying
spent sulfuric acid

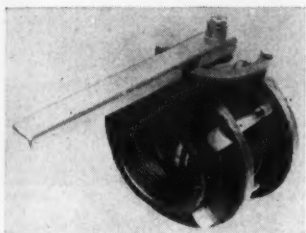
C P Staff Photo

Positive holding provided by irreversible control for butterfly valve

Uses: As valve metering control.

Features: Positive holding of butterfly valves under extreme pressures at an infinite number of settings is possible with automatic irreversible control device. Positive holding without creepage is assured even under severe vibration conditions. Unit is designed to fail-safe under destructive forces. It cannot jam.

Description: Valve metering control device, an automatic irreversible controller, can withstand up to 1000 in-lb torque with less than 1.160° deflection in a 4" valve, when line surge pressures are encountered. Irreversibility is provided by a patented action



Automatic irreversible control device assures positive holding of butterfly valves without creepage, even under severe vibration

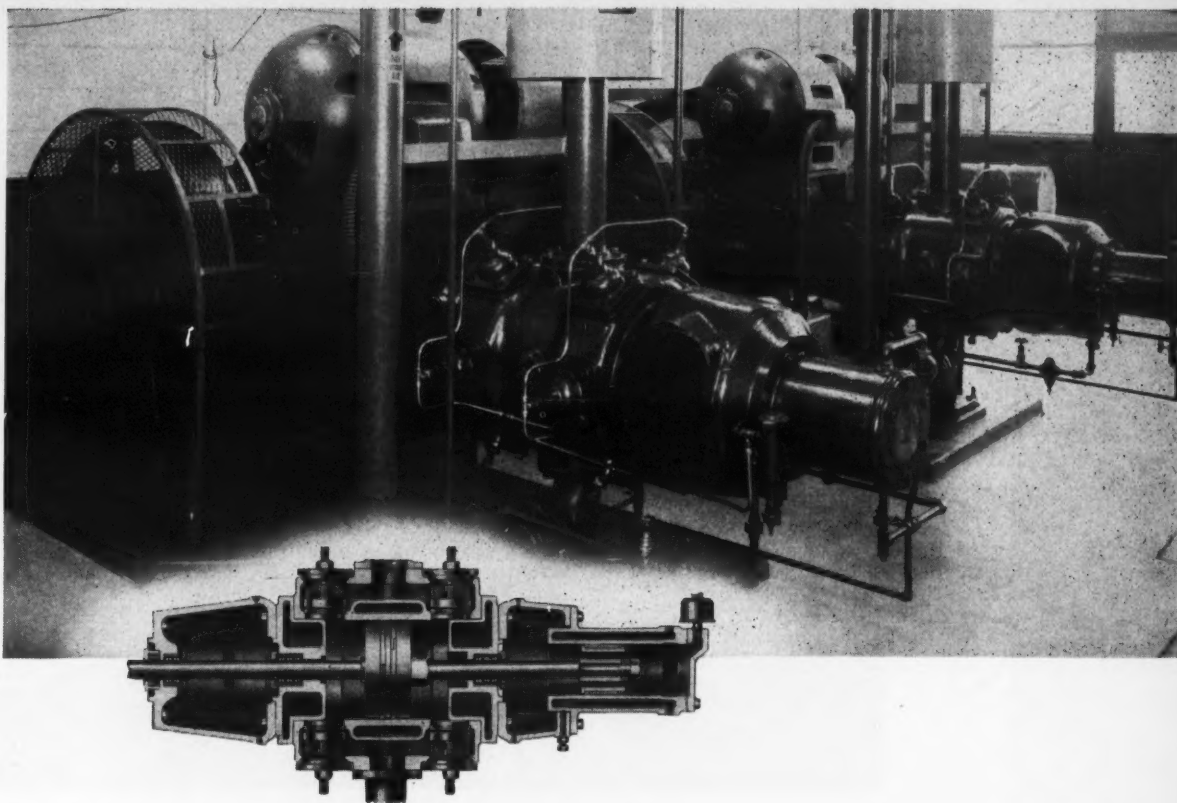
which uses pins (shear) held in shoes to create a reaction on a quadrant.

As pressure is applied in one direction, one pin in each of the shoes is slightly rotated and brought to bear on the quadrant, providing the locking action. As reverse pressure is applied, the alternate pins come into contact.

To unlock the control for new settings, the shoes (held apart by spring action) are moved together slightly. This movement can be manual, solenoid, hydraulically actuated, or motor driven. Minute movements can be achieved where inching is desirable.

(Valve metering control is manufactured by Reid Metal Products, Inc., 2021 North Lincoln St., Burbank, Calif.)

Check 1656 opposite last page.



**with PENNSYLVANIA tailrod construction,*

COMPRESSORS PROVIDE GUARANTEED OIL-FREE AIR

Protect your processing and instrumentation from the effects of oil or oily vapors in compressed air or gas with Pennsylvania Class 3-ATC tailrod compressors. These compressors are designed specifically for this service—not ordinary "oil-less" compressors adapted from conventional units.

Customers have found that the Pennsylvania 3-ATC provides long life and unsurpassed performance in installations where even the slightest amount of lubricant or oily vapor would interfere with delicate instruments, contaminate food and beverages or be incompatible with chemical processes. A typical user comment on tailrod compressors: "Machines have been in operation almost 19 years . . . we would consider maintenance to be entirely nominal."

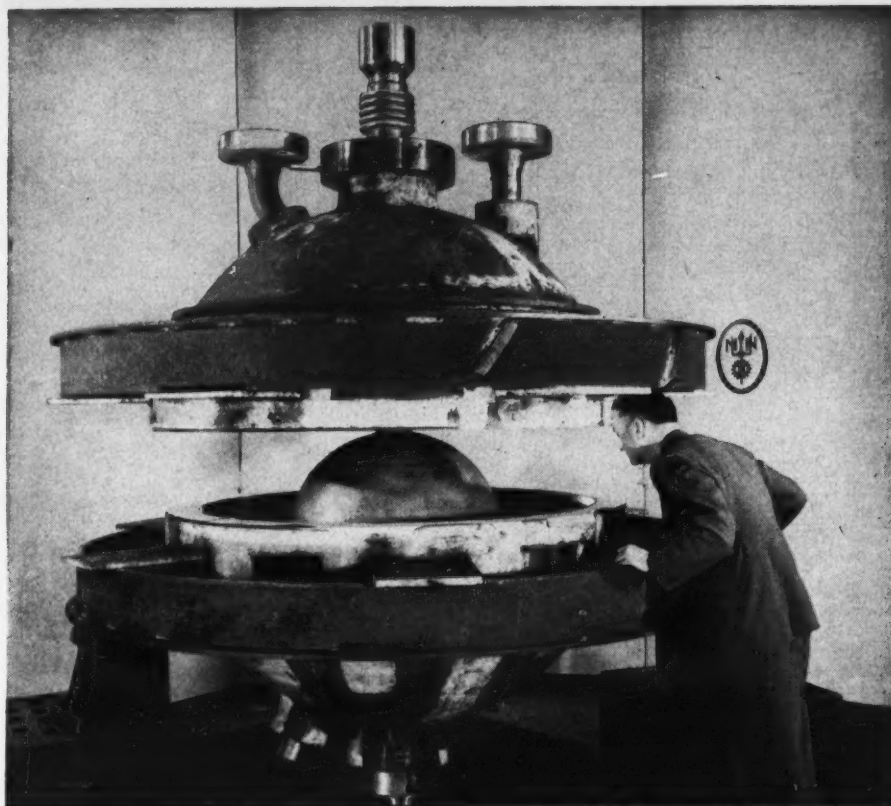
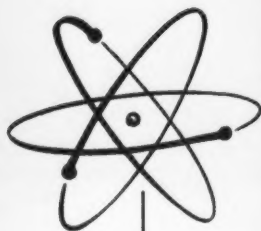
Full details of the 3-ATC Compressor, which uses the Air Cushion Valve, noted for its simplicity of design and dependability in service, can be found in Bulletin 202. Write for your copy today.

**With PENNSYLVANIA tailrod construction* a full floating piston greatly prolongs the life of carbon piston rings and eliminates the danger of scoring cylinder walls. An extra long distance piece between cylinder and frame assures that no part of the piston rod which enters the lubricated frame will enter the cylinder stuffing box. Result: a compressor which will deliver air or gas guaranteed 100% free of oil or oily vapors due to lubricants.

PENNSYLVANIA PUMP AND COMPRESSOR CO.

Easton, Pa. • Earning customer confidence since 1920

Check 1657 opposite last page



Assembly of zircaloy-2 core tank and pressure vessel for Homogeneous Reactor Experiment No. 2 (HRE-2). The HRE-2 is a 5,000 KW plant designed for AEC by Union Carbide Nuclear Company. Newport News manufactured the 32" I.D. core vessel from 5/16" zircaloy-2, which involved

the development of new welding techniques. The pressure vessel of Type 347 stainless clad steel is 4.4" thick, with an inner diameter of 60". Newport News designed the expansion joint between inner and outer vessels, and also produced the unusual coil-cooled blast shield for the unit.

Zircaloy-2 vessel produced by Newport News...for first two-region breeding homogeneous reactor

Never before had a pressure vessel been constructed from zircaloy-2.

Extremely active chemically, particularly at elevated temperatures, this alloy challenged fabrication. Unshielded, heated zircaloy absorbs atmospheric gases in quantities that render its corrosion and physical properties unsatisfactory. Newport News, however, achieved consistent, satisfactory welds by use of inert gas and novel, plant-developed shielding.

The core tank contains the fuel region where fissioning produces heat. The blanket or reflector region around the tank is confined by a

pressure vessel of stainless clad steel.

Newport News, working with its suppliers, developed special fabrication and welding techniques, as well as forge and rolling methods to produce plates and forgings with required corrosion, nuclear and physical properties for both vessels.

Make Newport News your source for fabricated metal structures. See how this company's high integration of skill and facilities can help you. Our illustrated booklet, "Facilities and Products", is yours for the asking. Write for your copy now.

Newport News Shipbuilding and Dry Dock Company
Newport News, Virginia

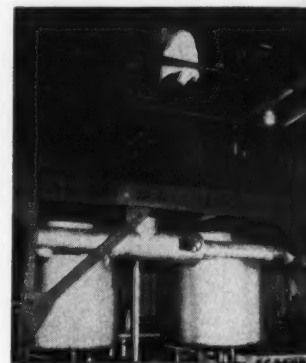
Check 1658 opposite last page

PETROCHEMICALS

Horizontal-plate filters effectively recover catalyst

Two horizontal-plate filters are doing an effective job at National Aniline Division, Allied Chemical Corporation, Moundsville, W. Va. High flow rate, cake stability, and precoat economy are advantages found for the filters.

Each unit has a stainless steel filtering surface of 200 sq ft. Filters handle about 17,700 lb of mixed tolylene diamine during a filtration cycle of several hours. Toly-



CP Staff Photo

Filters at National Aniline

lene diamine is recycled until it comes clear.

During the filtration cycle, filters are blanketed with N_2 to avoid possible explosion hazard. A precoat is used on the filters. Product is filtered under a pressure of about 60 psi at a temperature of 125°C.

Horizontal-plate filter is especially advantageous for applications where a filter aid or precoat is used. Filter aid can be floated naturally into position, making for a porous, uniform filter cake. Cake stability is assured. This improves flow rate and minimizes loss of product being recovered. Channeling or bypassing is unlikely with this type of filter. No appreciable maintenance has been necessary on either filter since they were placed in service about two years ago.

(Horizontal-plate filters are product of Sparkler Mfg. Co., Mundelein, Ill.)

Check 1659 opposite last page.

CHEMICAL PROCESSING

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Aliphatic Dinitriles And Diamines Prepared From ISOSEBACIC® Acid

A new method of synthesizing aliphatic dinitriles and diamines — some of them believed to be new compositions of matter — is described in U.S. Patent 2,824,118, recently issued to U.S.I.

ISOSEBACIC acid is reacted with ammonia and/or urea or other nitrogen-containing compounds to form a mixture of C₁₀ dinitriles. They are primarily sebacitrile, α -ethylsubero-nitrile and α,α' -diethyladiponitrile.

The nitrile mixture can then be hydrogenated in the presence of ammonia and a catalyst to yield C₁₀ diamines. They are a mixture of decamethylene diamine, 1,8-diamino-2-ethyl-octane and 1,6-diamino-2,5-diethylhexane.

The dinitriles are considered valuable as chemical intermediates, and for solvents, lubricants, plasticizers and textile water repellants. The diamines should be useful in the synthesis of various types of polyamides — particularly fibers — and in plastics, rubbers, plasticizers, synthetic lubricants, polyurethanes and other products.

Nutritional Dystrophy Studies Show Lower Methionine in Blood

It has been reported that determinations of methionine in the blood of children with nutritional dystrophy average considerably below normal. In a study of whole blood from malnourished and normal boys, methionine content was found to average 73 mg. lower in the first group (331 ± 16 mg. as against 404 ± 16 mg. for the normal group). Determinations on the serum alone did not reveal a similar variation.

It was felt by the investigators that low values in the whole blood of the malnourished children might be due to hypochromic anemia prevalent in the group.

390 Million Nonfood Aerosols Sold in 1957

The Chemical Specialties Manufacturers Association estimates that 390 million non-food aerosol units were produced in 1957, based on 339 million units reported in their survey and adjusted for companies not responding. Here's how the report looked, in millions of units:

Hair Sprays	94.4
Shaving Lather	50.9
Room Deodorants	41.9
Insect Sprays	41.5
Coatings	36.5
Colognes and Perfumes	17.9
Household Products Other Than Room Deodorants and Glass Cleaners...	16.9
Personal Products Other Than Shaves, Hair Sprays, Colognes & Perfumes	12.3
Glass Cleaners	11.2
Miscellaneous	15.6

New Roles Seen for Ethanol in Medical & Pharmaceutical Fields

Recent Developments Include New Nerve Block Application,
And Improvement of Ruminant Nutrition

Medical and biochemical research on ethyl alcohol — best known as a solvent — is constantly revealing new facets of its personality. It is evident that ethanol

Heterocyclic, Homocyclic Systems Made by New Route

Research chemists have discovered that heterocyclics and homocyclics can be synthesized by an entirely new method. Potassium amide is reacted with the starting material to form a benzyne intermediate with a nucleophilic center. Nucleophilic means "seeking an electron-deficient group." In the presence of liquid ammonia, this center then adds intramolecularly to give a closed-ring compound.

Indane, indole, 2-phenylbenzothiazole, benzoxazole and phenothiazine have all been made by this new technique, and the research group believes it can be used to prepare many other hetero- and homocyclic compounds. Both five- and six-membered rings have been formed, all through intramolecular addition of nucleophilic sulfur, oxygen, nitrogen and carbon.

Stauffer's TiCl₄ Plant Bought by Mallory-Sharon

Stauffer Chemical Company's new 50 million pound-per-year titanium tetrachloride plant at Ashtabula, Ohio has been purchased by Mallory-Sharon Metals Corporation, which in turn is one-third owned by U.S.I. The new acquisition completes the company's integration of facilities for producing titanium — from ore to finished mill products.

New Method for Making Glycidyl Esters

The glycidyl esters — important as perfume and flavor ingredients, and in vinyl plasticizers, stabilizers and resin intermediates — can now be synthesized by using sodium hydride in oil as the condensation reagent in the Darzen condensation reaction.

When employed together with a ketone and a chloroacetate acid ester, NaH in oil is reported to give excellent yields in short reaction times at room temperature, with little or no side reaction.

NaH in oil is a 50% dispersion of 2-25 micron particle size crystals in an inert white mineral oil. It is handled as a solid which can be fed directly into reaction vessels either mechanically or by hand.

NaH in oil is prepared from dispersed sodium and hydrogen at 190-225°C. Its preparation is described in U.S.I.'s brochure "Sodium Dispersions," available on request.

has many modes of action—physical, chemical and biological — that are important to the doctor, the nutritionist and the producer of pharmaceuticals.

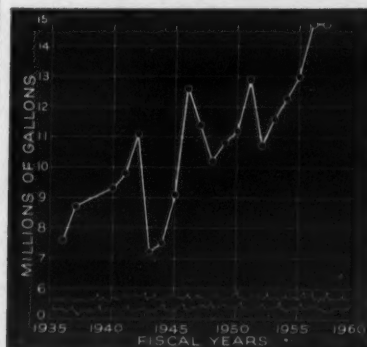
The practical use of ethanol in medicine as a nerve block agent is increasing. A few months ago a team of radiologists and neurosurgeons revealed a method of treating the painful facial *tic douloureux* by radiologically controlled injections of absolute alcohol. Forty-five patients so treated experienced immediate relief of symptoms, it was reported, although several had to be retreated, and one finally had to undergo the usual surgery.

New Function in Microbiology

Fermentation processes utilize several of ethanol's well-known modes of action—solvent, carbon source for yeast growth, and nutrient raw material for bacterial conversion into other chemicals.

And now, within the last year, a patented* novel use of ethanol in fermentation has begun to revolutionize the ruminant feed industry. It has been discovered that alcohol ingestion by cattle and sheep accelerates rumen microflora metabolism, by acting as a hydrogen donor. Ethanol has the unexpected property of maintaining a low oxidation-reduction potential in the rumen. This allows greater utilization of natural feeds rich in cellulose, and enables the micro-organisms in the rumen to make better use of nonprotein nitrogen materials such as urea. The microfloral cycle is

MORE



Graph shows consumption of specially denatured alcohol in pharmaceuticals and toiletries.

Sources: (a) STATISTICS ON THE USES OF SPECIALLY DENATURED ALCOHOL, Internal Revenue Service (data for 1936-1937 and 1940-1957). (b) ANNUAL REPORTS OF THE COMMISSIONER OF INTERNAL REVENUE, Internal Revenue Service (data for 1938 & 1939).

U.S.I. CHEMICAL NEWS

CONTINUED

Ethanol

accelerated, thus increasing the daily rate of protein synthesis and cellulose digestion.

It is thought that this new role for ethanol may find application in other fermentation processes allied with the manufacture of pharmaceuticals and biologicals.

Ethanol Is a Surfactant

Ethyl alcohol is being used as an antifoam to relieve pulmonary edema in humans which sometimes occurs immediately after surgery. Under such conditions foaming in the lungs interferes with oxygenation. Inhalation of 95% alcohol vapor modifies the surface tension of the fluid and reduces the amount of foam in the lung. It is reported to produce immediate and dramatic recovery in most medical cases.

Protective Action in Body

Data is continually being compiled on the action of ethanol as a protective agent in the body. Organophosphate compounds, such as chemical warfare nerve gases and some agricultural insecticides, are known to act by inhibiting the formation of serum cholinesterase by the organism. It has recently been discovered, that ethanol protects against this inhibiting action.

Animal experiments have shown that pre-administration of ethanol gives considerable protection against radiation sickness.

Role in Body Metabolism

In the human body, moderate doses of ethyl alcohol have been found to exert a protein-sparing action—improving protein storage and growth. And it has been reported that a positive nitrogen balance is more easily maintained in human convalescence when glucose and amino acids are supplemented with ethanol. Studies on animals show that ethanol also helps mobilize vitamin A from storage depots in the body.

The roles of ethyl alcohol as a vasodilator, as a stimulant, and as an antiseptic and disinfectant are well known, but should be mentioned here to round out the perspective on this U.S.I.-produced compound—one of the most versatile and valuable chemicals the medical and pharmaceutical fields have at their disposal today.

*U.S. Patent 2,808,332—Anderson and Rapp

U.S.I. Tank Car Domes Now Color-Coded for Product

The entire U.S.I. fleet of 900 tank cars is being repainted black on light gray, with the traditional U.S.I. oval in black and red. Inherent in the new design is a color-coding system that immediately identifies the type of service for which tank cars are used. Domes of the tank cars are painted any of the following identifying colors:

Solid Domes

General Service (alcohol, etc.) White
Ethyl Ether Light Blue
Chlorine Light Green
Ammonia Bright Yellow
Sulphuric Acid Black
Phosphatic Fertilizer
Solution Bright Orange
Nitrogen Fertilizer Solution Bright Red
Caustic Soda Cars Maroon
Metallic Sodium Gray

Black Domes with 4 Inch Color Stripes

Ethyl Chloride Black with Orange
Olefin Black with Yellow
Miscellaneous gasoline,
waste material Black with Red

This new color-coding system provides U.S.I. with a double check—an at-a-glance opportunity to pick up errors before cars reach the loading rack.



Black, light gray and color-coded dome combine to give new look to U.S.I. tank car fleet. Overall design was chosen to give company identity, dome color to give product identity. Here a newly painted U.S.I. Alcohol tank car with identifying white dome is loaded at Tuscola, Ill.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

N-meta-*o*-tolyl phthalamic acid has been discovered to increase plant yields by reducing shock and stress of heat, cold, long rains and drought. Material has been test-sprayed on limas, cotton, cherry trees. **No. 1390**

New booklet on polyethylene film, coatings and molded items for packaging field illustrates advantages of material in terms of economy, appeal, protection of product and convenience. **No. 1391**

Zone-melting purifier for organic compounds now on market. Claimed to permit preparation of hyperpure solids in laboratory through slow travel of ring heater up along glass tube containing solid. Impurities concentrate at top. **No. 1392**

New insect repellent, diethyltoluamide, is said to be most effective ever developed for mosquitoes, fleas, ticks, chiggers, deer flies. Product now being made with 95% minimum meta isomer content. **No. 1393**

Rare books on science and medicine which can be purchased are listed in new catalog which includes 258 works, alphabetically by author. Catalog covers only a portion of books available. Lists works printed from 1485 to 1929. **No. 1394**

A new aluminum hydroxide-magnesium carbonate co-precipitate dried gel is being sold which, it is claimed, will permit antacid producers to market tablets and powders with the same therapeutic value as the usual liquids. **No. 1395**

Series of ultrasonic units—mass-produced, low-cost, laboratory-size—has been developed for cleaning small delicate parts or assemblies, glassware, apparatus. Also suggested for biological, medical, chemical studies. **No. 1396**

2-Carboethoxycyclopentanone is now available commercially for pharmaceutical and fine chemical applications. Is precursor for many 2-substituted cyclopentanones. Enters into variety of reactions typical of beta-ketoesters. **No. 1397**

3-Sulfolene and some derivatives can now be obtained in research quantities. It is a controlled source of pure sulfur dioxide. As an intermediate, it reacts with chlorine, water, ammonia, alcohol and mercaptans. **No. 1398**

Odor-metering apparatus and techniques for its application to industrial odor-control problems are described in new 4-page brochure. Odor meter measures subjective impressions, must be operated by experienced personnel. **No. 1399**

PRODUCTS OF U.S.I.

ALCOHOLS

Ethyl Alcohol (Ethanol): Specially denatured—all regular and anhydrous formulas. Completely denatured—All regular formulas for industrial use, anti-freeze. Pure alcohol—USP 190°—Absolute, N.F., taxfree, taxpaid.

Proprietary Denatured Alcohol Solvents: SOLOX®—General-purpose. FILMEX®—Special, authorized for certain industries. ANSOL® M—Anhydrous, special blend for lacquers, resins, etc. ANSOL® PR—Anhydrous, special blend with higher ester content and solvency for lacquers, resins, etc.

OTHER PRODUCTS

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl

Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, and 2-Ethyl Heptanoic Acid.

PETROTHENE® Polyethylene Resins

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Anti-oxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadiene (Vitamin K₃), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixers, U.S.I. Permadry, Vitamin B₁₂ Feed Supplements, Vitamin D₃, Vitamin E Products, Vitamin E and BHT Products.

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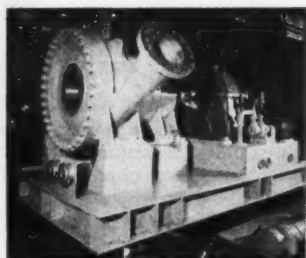
U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

**Compressor operates
at working pressure
up to 500 psia**

Uses: Unit was developed for applications in plants where it is desirable for an existing air or gas system to be converted to a higher pressure. Designed primarily for petroleum and chemical industries, unit is also suitable for applications including recirculating high-pressure gas for cooling and for processing.

Features: Compressor can operate at a working pressure up to 500 psia. Similar conventional units have a maximum working pressure of approximately 50 psia. Compact compressor has few wearing parts, and is smooth running.



Compact single-stage compressor can operate at working pressure up to 500 psia

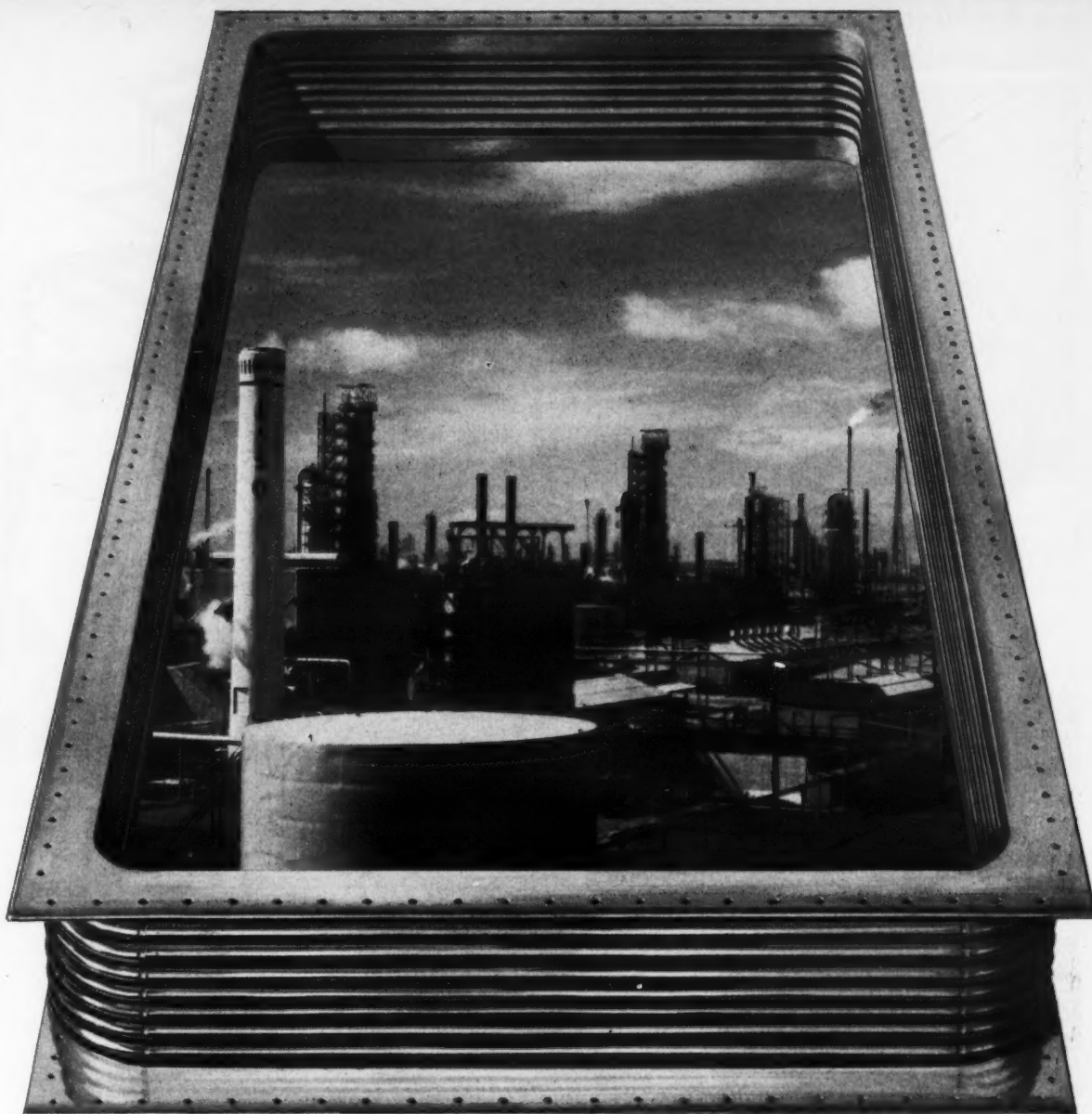
Description: Single-stage centrifugal compressor is built in a barrel-type casing. Three principal parts of casing are casing cylinder, bolted casing head, and fabricated bearing pedestal.

A diaphragm is inserted into the casing to form the diffuser passage and a discharge-gas passage. Good sealing is assured with this design, since there is only one shaft extension and one casing joint to seal. The joint is vertical with a metal-to-metal fit positively sealed by a gasket.

(Single-stage barrel-type compressor is product of Allis-Chalmers Mfg. Company, Milwaukee 1, Wis.)

Check 1660 opposite last page.

For more information on product at left, specify 1661 . . . see information request blank opposite last page.



Giant refineries like Esso Baton Rouge use Sola-Flex® Expansion Joints

FORTY OF AMERICA'S FIFTY largest businesses—power, petro-chemical, nuclear and others—use Sola-Flex expansion joints to help solve difficult piping problems. The giant Esso refinery at Baton Rouge has installed 6 ft rectangular Sola-Flex joints in some of its critical equipment where it is necessary to handle difficult extremes of thermal growth and vibration.

Solar manufactures the most comprehensive line of expansion joints in the world. They are made in a wide variety of stainless and high-temperature alloys in a complete range of sizes, from ½ in. to 35 ft in diameter. Temperatures range from -320F to 1200F; pressures from complete vacuum to 600 psi and up. *And rugged, economical Sola-Flex joints can be "in service"*

one to four weeks after receipt of order!

A new pamphlet describes Solar's complete line of Sola-Flex expansion joints. Write for it to Dept. F-70, Solar Aircraft Company, San Diego 12, Calif.



Check 1662 opposite last page



"B&W Tubing Met My Needs Exactly!"

"As a design engineer in the petroleum processing field, I'm interested in getting components which best meet all service conditions involved and offer the least difficulty in fabrication."

In a heater such as this, pressures, temperatures, oxidation, corrosion, strength and tube size were factors the design engineer had to consider. Tubes of various sizes and three grades of steel were specified for the job. The tubes were produced under B&W's rigid quality control procedures to meet anticipated service conditions and to provide ease of fabrication.

Engineers find it pays to specify B&W Tubing. It is available in such a broad range of grades, types and sizes in carbon, alloy and stainless steels that it can be matched to service and fabricating conditions. For information — call Mr. Tubes, your B&W sales representative, or write for bulletin TB-417. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges — in carbon, alloy and stainless steels and special metals.



TA-8019-PP4

Check 1663 opposite last page

PETROCHEMICALS

Polypropylene plant to be built by Humble Oil

Will be marketed by Enjay and Spencer Chemical

Morgan J. Davis, president of Humble Oil Company, has announced that his company will build a polypropylene plant at Baytown, Texas. Plant, which will go on stream in late 1959, is being designed with an initial capacity of 40 million lb/yr, which can be expanded to 100 million lb/yr.

Polypropylene made by Humble will be marketed by Enjay Company, Inc. Enjay will not only market the plastic through its own sales organization, but will supply Spencer Chemical Company with polypropylene for resale throughout the United States.

Being one of the most promising of the new petrochemical plastics, polypropylene is strong and clear, with outstanding resistance to heat and to many chemicals and solvents. It is made from refinery propylene gases.

Pressures of 15,000 psi at -320 to 1000°F resisted by seal

Can withstand temperature and pressure cycling

Recent technical paper contains laboratory test results that show the effectiveness of a method for sealing at extreme temperatures and pressures. Method employs a metal O-ring and two retainers of dissimilar metals. These retainers back up the ID and OD of the metal O-ring. Design is known as the Met-O-Seal.

Test results indicate that the seal will operate effectively at pressures greater than 15,000 psig at temperatures lower than -320°F and higher than 1000°F. Furthermore, the seal can be both temperature and pressure cycled without impairing its performance.

One of the test programs involved a 27" seal for liquid oxygen service. This seal was

temperature cycled between ambient and -320°F on 10 occasions. After each reduction in temperature, the test flanges were pressure cycled between 0 and 80 psig 25 times. No leakage occurred. Other similar tests have been run on seal at extreme conditions with good results. Untreated seal has been found to resist the effects of strong bases and acids except hydrochloric. Coating affected portion with Teflon improves resistance to HCl.

(Condensed from technical paper on Met-O-Seal prepared by John Jordan, Research Chemist, Parker Seal Co., Div. of Parker Hannifin Corporation, Culver City, California.)

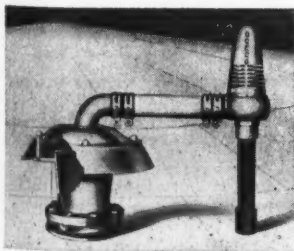
Check 1664 opposite last page.

Ups product savings, cuts tank breathing to minimum

Report relief valve savings amortized it in 7-8 months

Uses: For regulating tank pressure.

Features: Unit is said to reduce tank breathing to the minimum that the pressure and vacuum characteristics of the tank will permit, thereby increasing product savings to the maximum. According to manufacturer, valves do not



Sensitivity of tank relief valve is key to its efficiency

open until the pressure setting in the tank reaches the pressure setting of the pilot, or the vacuum in the tank reaches the vacuum setting of the valve. Company records show that valves in service have paid for themselves in 7 to 8 months by saving the

vapors that conventional units waste.

Description: Pilot operated relief valve was developed for cone roof and other low pressure tanks. System consists of a valve mounted on a tank, connected through a 3" diameter aluminum tube to the pilot, which is also mounted on the tank. Pressure on the tank is applied against the bottom of the pilot valve — and through the tube to the large area on top the resilient membrane — keeping it tightly seated on the valve and preventing any "simmering" and "leakage" at less than set pressure.

Because of its sensitivity, the pilot opens full the instant the tank pressure reaches its set pressure, evacuating vapors from the top of the membrane, which opens instantly to full flow position, releasing tank pressure. The pilot closes automatically when the pressure in the tank has been released, reseating the membrane again and shutting off the flow.

(Pilot operated relief valve is product of The Oceco Div., The Johnston & Jennings Co., 6917 Bessemer Ave., Cleveland 27, Ohio.)

Check 1665 opposite last page.

French plant licensed for synthetic rubber, plastics production

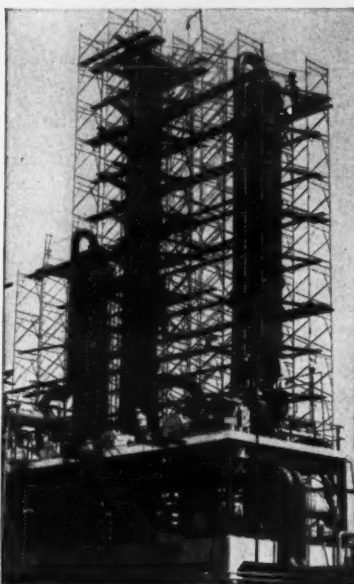
Exclusive license to produce oil-resistant synthetic rubbers and high impact plastic materials has been granted to French chemical manufacturer. Societe d'Electro-Chimie d'Electro-Metallurgie et des Acieries Electriques will operate under patent rights that U.S. Rubber holds in France. The American company will provide technical assistance for the construction and operation of a plant to produce acrylonitrile butadiene-styrene copolymers and nitrile, oil-resistant synthetic rubbers.

(Information courtesy of United States Rubber Company, 1230 Avenue of the Americas, New York 20, New York.)

Scaffolding Methods...by Patent Scaffolding Co.



MOVE IT AROUND—For jobs requiring a working surface at a fixed height 3' to 9' above ground or floor level, these aluminum work stands provide the portability of ladders, plus the extra safety and wider application of scaffolding. Ideally suited for reaching hard-to-get-to valves and gauges, inspecting and cleaning tanks, loading and unloading warehoused materials, speeding up a hundred other processing and maintenance jobs. Can be anchored where fixed platforms are required. Platforms of nonskid perforated aluminum vary from 2' to 4' in width, 2' to 8' in length. Special stands for special purposes can be supplied. Write for Bulletin AS-9.



PREFAB PLATFORMS—"Trouble Saver"® Sectional Steel Scaffolding is made of prefabricated frames, diagonal braces, bases and adjustable legs. Frames vary from 2' to 5' wide and from 3' to 6'6" high to provide proper heights and widths of working platforms to fit the job. Here, it gives maintenance crews easy, safe tower access.

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

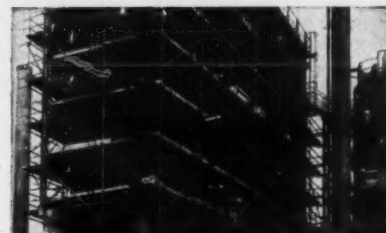
SALES

RENTALS

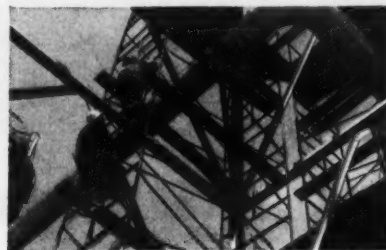
FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th St., Dept. CP, Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
In Canada: 355 Dufferin St., Toronto
Branches in all principal cities.



AT EVERY LEVEL—Versatile, all-purpose "Tubelox" Scaffolding provides working platforms at every level on coke drum and pipe still sections. Minimum wood staging is required.



EASY ACCESS—To get up and around heater units, workers quickly assemble "Trouble Saver" Scaffolding frames to exact heights. Built-in ladders speed the job by providing fast, easy access. Wood planks give necessary staging. 100% recoverable, "Trouble Saver" and "Tubelox" Scaffolding can be economically used indefinitely on many types of jobs.

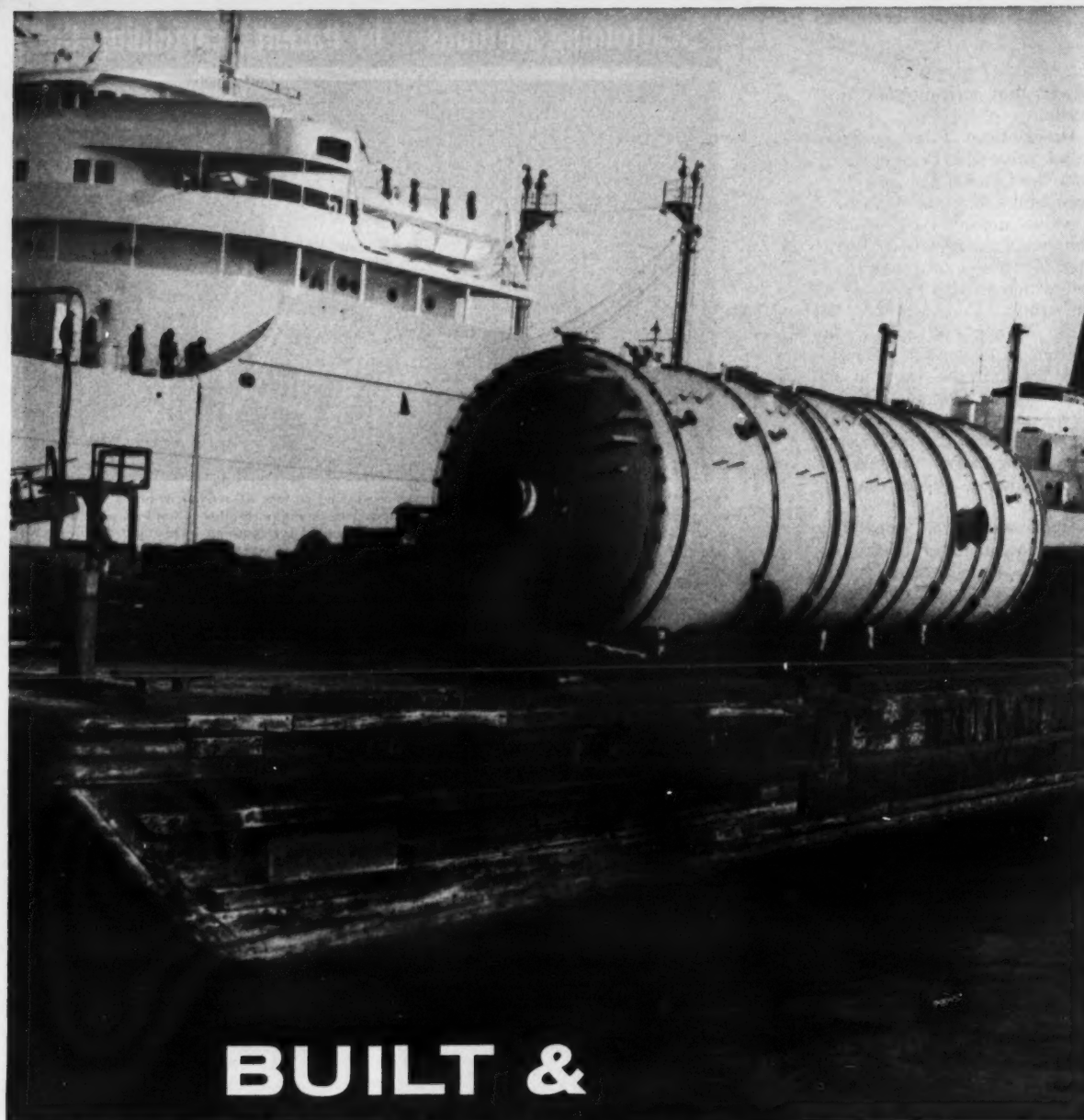
CLIP COUPON TO YOUR LETTERHEAD

Send me literature on:

- ☐ "Tubelox"
☐ "Trouble Saver"

Your Name

Check 1666 opposite last page



BUILT & SHIPPED... ON

TIME Today, modern oil refineries and chemical plants require more and more complicated pieces of fabricated equipment—too large to ship by rail or road. To meet this need, Sun Ship specializes in building and shipping large carbon or alloy steel units by water (inland, coastal or overseas)... directly from our plant.

SUN SHIP
BUILDING & DRY DOCK CO.
CHESTER, PENNSYLVANIA

Check 1667 opposite last page

PETROCHEMICALS

Thermal stability to 400°F furnished by rings for compressors

Outstanding thermal stability from room temperature to 400°F is provided by compressor rings made from virgin Teflon, glass fiber, and a special compounding agent.



Compressor ring is of uniform density

Rod packing in both segmental and cup and cone types is also available made from the material. Products are leak-proof and impervious to most corrosives.

(Fluorogreen L compressor rings and rod packing are products of John L. Doré Co., 5406 Schuler St., Houston 7, Texas.)

Check 1668 opposite last page.

Refractories of a number of different types are described in detail in six-page bulletin. Castables to meet specific requirements for petrochemical plants and oil refineries are included. Bul 1223 — Harbison-Walker Refractories Co., Pittsburgh 22, Pa.

Check 1669 opposite last page.

Diaphragm breather valve maintains efficient, vapor-tight seal

Design, rugged durability provide high flow capacities

Uses: For venting storage tanks containing petrochemical and petroleum products.

Features: Unit maintains an efficient vapor-tight seal at tank pressures and vacuums less than settings. Simple construction, compact design, and rugged durability of unit provides high flow capacities at relatively small pressure or vacuum beyond vent settings.

Description: Added to com-

pany's line of mechanical storage tank fittings is 3" diaphragm-type breather valve which embodies the performance characteristics of larger size breather valves. The 3" valve's nominal standard setting for either vacuum or pressure is 1.1" water. Valve



Diaphragm-type pallets of 3" breather valve maintain efficient, vapor-tight seal

characteristics: opening at 1.2"; closing at 1.0".

Design of valve is such that the peeling action takes place between the pallet diaphragm and the seat during opening, which helps overcome sticking and freezing.

(ST-7575 breather valve is product of Shand and Jurs Company, 2600 Eighth St., Berkeley 10, Calif.)

Check 1670 opposite last page.

Udex installation first on stream in Japan

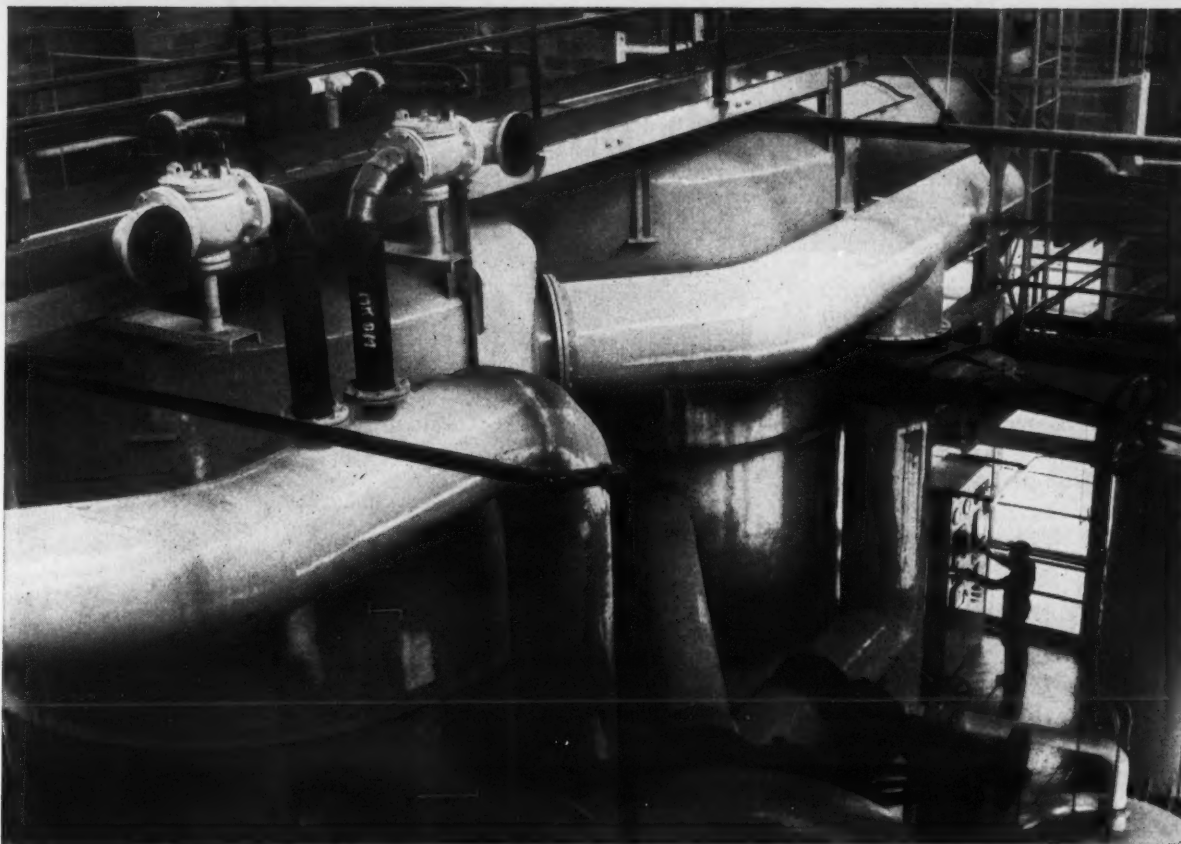
Marking entrance into the petrochemical field, the Mitsubishi Oil Company, Ltd. of Kawasaki City, Japan, recently put the first Udex installation in that country on stream. The unit has a design capacity of 750 B/SD to produce benzene, toluene, and xylenes.

(Udex installation was designed and engineered by Universal Oil Products Company, 30 Algonquin Road, Des Plaines, Ill.)

Check 1671 opposite last page.

Steel mesh for castable linings is subject of four-page brochure. Hexagonal mesh described retains linings in large vessels and retards erosion. Bul on Gridsteel — Irving Subway Grating Co., Inc., Long Island City 1, N. Y.

Check 1672 opposite last page.



Evaporator bodies and vapor piping at the new \$12 million chlorine-caustic soda plant of Hooker Chemicals Limited, No. Vancouver, B. C., are made of solid Nickel and

Lukens Nickel-clad steel to guard against caustic corrosion, to assure product purity. Much of the equipment was supplied by Puget Sound Fabricators Inc., Seattle, Wash.

"Bodyguards"... Nickel, Monel alloy... prevent corrosion, metallic pick-up at Hooker's new caustic soda plant

To prevent caustic corrosion . . .

To safeguard product purity . . .

These are the principal reasons why Inco Nickel and Monel* nickel-copper alloy are used in the new


chlorine-caustic soda plant of Hooker Chemicals Limited.

Equipment made of corrosion-resisting Inco Nickel and its alloys frequently gives more than a decade of

service in handling strong caustic. Equally important, Nickel equipment has enabled producers to make millions of tons of caustic a year with less than 100 ppm of metallic impurities.

It will pay you to specify equipment of Inco Nickel, Monel alloy or Nickel-clad steel. Inco Nickel Alloys can be obtained in most mill forms right from warehouse stocks. (Listed under "Nickel" in your classified directory.)

Get complete technical data and service records. Write for "The Resistance of Nickel and Its Alloys to Caustic Alkalies." *Registered trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street  New York 5, N. Y.

See how Nickel and Monel alloy are used in Hooker's new chlorine-caustic plant equipment

EQUIPMENT	MATERIAL	EQUIPMENT	MATERIAL
Caustic Tank	Nickel-clad steel	Salt receiver tanks	Nickel
Evaporator body	Nickel	Salt separator tanks	Nickel
Second effect vapor body	Nickel-clad steel	Barometric condenser	Monel alloy
Third effect vapor body	Nickel-clad steel	Cylinder coolers	Nickel-clad steel
		Cooling coils	Monel alloy tubing

INCO NICKEL ALLOYS

Check 1673 opposite last page

The Problem:

Protection against
product contamination
... confinement of
obnoxious vapors.



**G-B Supplied the answer
with this INTERNALLY
Jacketed Flaker**

The unit shown is fitted with a G-B internally jacketed fabricated drum 60" diameter by 120" long having a polished chrome plated surface. A stainless steel steam jacketed feed pan and stainless steel vapor enclosure protect against product contamination and confine obnoxious vapors.

This is another application where G-B equipment was selected. More detailed information on request.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

**FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS**

Check 1674 opposite last page

PETROCHEMICALS

**Helps steam tracers
keep lines hot**

Cement also used on valves
and pumps

Problem: Bare steam tracers run along or wrapped around pipe were not entirely satisfactory for keeping lines hot in urea synthesis section of Grand River Chemical Division, Deere & Co., Pryor, Okla. Tracers, using steam at 5 to 185 psig, did not have as high heat transfer as desired since the tracers had only a limited amount of contact surface for heat transfer.

It was particularly necessary to keep lines hot handling various concentrations of urea up to molten urea. Temperatures vary from 150-350°F.

Solution: About three years ago plant started using a heat transfer cement, called Thermon, which is trowelled over steam tracing lines and molded around pipe. It is also used with tracing on valves and pumps.

Plastic compound has been used over copper, steel, and stainless with good bonding. It has been found more difficult to bond it to aluminum. Material must be weather-proofed and kept essentially dry once in place. It must also be protected from mechanical damage.

Results: Plant's experience with the heat transfer cement has in general been good. Fewer tracers are needed and heat transfer is definitely better. Plant also uses some other methods of keeping lines hot, depending on service.

(Thermon heat-transfer cement is product of Thermon Manufacturing Company, PO Box 1961, 1017 Rosine St., Houston, Texas.)

Check 1675 opposite last page.

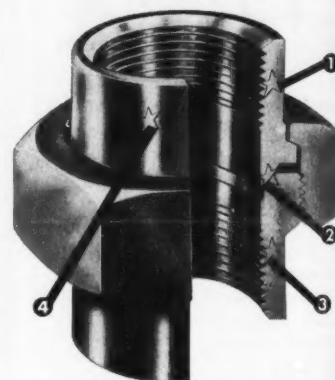
Packless rubber-lined pump — which has no stuffing box, no sealing device and no exposed metal parts — is covered in four-page bulletin. Abrasives and acids from 25 to 800 gpm can be handled with units. Bul 857 — The Allen-Sherman-Hoff Pump Co., 259 E. Lancaster Ave., Wynnewood, Pa.

Check 1676 opposite last page.



**only
CATAWISSA**

*gives you all these
features for your
forged steel pipe
union requirements*



1. Uniform walls for even expansion and contraction under temperature changes. They follow the pipe!

2. Catawissa Ball-to-Angle Seats give you a "Perfect Seal" regardless of pipe alignment!

3. More than adequate wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. Round, straight barrels for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections... and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

Write for Catalog 58 showing the complete Catawissa line of Perfect Seal Products.

for complete, guaranteed satisfaction

*... always specify
CATAWISSA*

CATAWISSA VALVE & FITTINGS CO.
CATAWISSA • PENNSYLVANIA

Check 1677 opposite last page

CHEMICAL PROCESSING

non-rubber applications for butadiene in the future.

Another avenue was to develop other products besides butadiene that could be made in plant without extensive changes in equipment. Accordingly, Petro-Tex started making butylene 1, butylene 2, di-isobutylene, and tri-isobutylene, all above 95% in purity.

Carrying this a step further, it was found that some other products could be made using the present intermediates as raw material. Accordingly, construction has started on facilities to make high-purity (99+%) isobutylene. It will be available in tankcar quantities in December 1958. Good economic possibilities are present in application of high-purity isobutylene in tertiary phenol derivatives, tertiary butyl amines, neopentyl alcohol, tertiary butyl alcohol, polyisobutylene polymers and copolymers, and in alkylations and alkylated compounds.

Aviation Alkylate

Although none of the foregoing moves toward diversification involved a major departure from olefin technology, the next step — building facilities to manufacture alkylate for aviation gasoline — will require a different technique and the expenditure of several million dollars. The alkylate plant fits in well with the present plant since it uses butylene feed, the same as is used for making butadiene. Alkylate will go on stream late in 1958.

Arrangements were made with Plymouth Oil Co. to take 50% of the alkylate. Plymouth had oil refining capacity, with the exception of facilities for the alkylate, through its subsidiary, Republic Oil, which is connected by direct pipeline with Petro-Tex. Plymouth had some C₄ olefins which were being sold. Now, instead of doing this, they are sent to Petro-Tex, alkylate being taken in return and blended into aviation gasoline. This arrangement presented an opportunity to both companies and an agreement was reached. The remaining 50%

New light on how nickel reduces corrosive attack by fast-moving chlorinated solvents



Most chemical processors know that dilute HCl formed by decomposition of chlorinated solvent-water mixtures corrodes steel much more readily than Nickel.

But it's not so widely known that in Nickel equipment there is less hydrolysis of solvent . . . less formation of HCl to cause damage.

National Aniline puts this Nickel extra to good use in making diisocyanate

From the time diisocyanate is formed in a Nickel-clad reactor at National Aniline's Moundsville, W. Va. plant, the product touches no metal other than Nickel. Tanks are Nickel. Miles of tubing. Pumps. Cast fittings.

Here in the photograph is just one example. It's a sight-flow indicator with cast Nickel body. Based on corrosion to date, this cast Nickel body is expected to last ten years or more despite location of the indicator in a return line carrying fast-moving chlorinated solvent, phosgene, and the troublesome dilute HCl.

Jacoby-Tarbox Corp. had Inco cast the body parts for this sight-flow indicator

In producing sight-flow indicators, pressure tightness and strength are all important. Gasketing, glass seal, and castings must meet high specifications and close tolerances.

Consequently, Jacoby-Tarbox has Inco cast the body of indicators that will be used in lines carrying corrosives. Inco is a primary source for Nickel and its alloys and the Inco foundry has long experience in casting these materials.

What can you expect from cast Nickel?

An Inco pamphlet, "Engineering Properties of Cast Nickel" answers this question in detail . . . covering compositions, physical constants, hot hardness, mechanical properties, much more. Send for your copy.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street

New York 5, N. Y.



INCO-CAST PRODUCTS

Check 1678 opposite last page



He's right ...

...because he knows how important it is to have his shipping containers...of uniformly high quality...delivered on time...ALWAYS.

Multi-plant operation assures **SERVICE**. 45 years of operation demonstrates **EXPERIENCE**. Wide range of containers proves **VERSATILITY**.

That's why so many men responsible for safe shipment of products of every type, size and description specify and insist on **MAXWELL!**

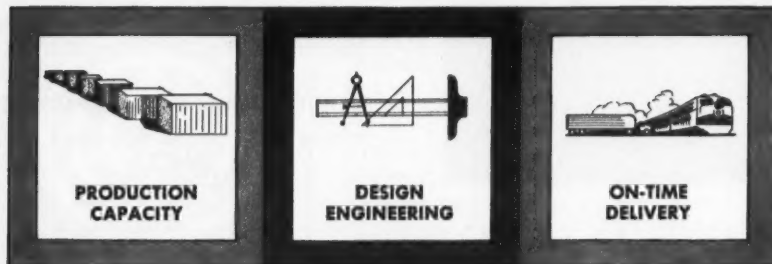
Let our representative call on you...quote on your requirements...and submit some money-saving ideas on corrugated, wirebound and plywood shipping containers based on our long experience in design and manufacture.

MAXWELL BROTHERS, INC.

GENERAL OFFICES: 2300 South Morgan Street • Chicago 8, Illinois

SOUTHERN SALES OFFICE: P.O. Box 242, Macon, Georgia

PLANTS: Chicago, Illinois • Albany and Macon, Georgia • Jasper, Florida



Check 1679 opposite last page

Petro-Tex

From preceding page

of the 3000 bbl per day of alkylate made by Petro-Tex will be available for the general market.

We have looked at the next line — oxygenated chemicals. These would be C₄-derived secondary butyl alcohol and methyl ethyl ketone, that would go to the solvent market.

One problem here is high marketing expenses. A supplier needs more than one or two solvents to offer. A customer usually wants several solvents in mixed truckload lots with overnight delivery. Petro-Tex would have neither a full line nor bulk storage facilities. Bigger customers are needed, such as refineries doing solvent dewaxing. There is a market in solvents, but we have not found it prudent to act as yet in view of foregoing problems.

A process for maleic anhydride has begun to show great promise. A new route to chloroprene for synthetic rubber is in an advanced stage of development. Polyolefin plastics are a natural for our operation, and we are finding some polymers which show unique properties.

Petro-Tex has, of course, continued to be in close touch with research people in the rubber industry. A process is being developed for manufacturing isoprene, the base material for natural synthetic rubber. Enjay is making this monomer as a by-product on a small scale for its butyl rubber. Market for synthetic natural rubber obviously depends on price of imported tree rubber.

Diversification, we have learned, is a step-wise proposition. By finding ways to upgrade the materials at hand, we have opened realistic avenues of thinking which will lead to a broad product line. These products can then be expected to grow to substantial volume, and to serve as starting points for products with established markets. In addition, our research effort is directed toward processes for products showing new unique properties which should find acceptance in the trade.

Hallco HA-5A

High Molecular Weight Polymeric Plasticizer

for use with

Vinyls
Cellulosics
Synthetic
Rubbers
Polymers

to prepare

Sheeting
Coated Fabrics
O-Rings
Molded Goods
Gaskets
Wire
Tapes
Cable

check these features

- Exceptional Permanence
- Excellent Compatibility
- Resistant to Ultra-Violet light
- Non-extractable
- Non-migratory



Ask for information about other Polymeric Plasticizers available for specific applications.

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

5245 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

Check 1680 opposite last page
CHEMICAL PROCESSING

Hooker's 'New Look'

From page 33

sales forecasting are also included in the function of the General Development Department.

Dr. Geiger regards the European Common Market and Free Trade Area as having the greatest percentage business growth potential in the world today. To capitalize on this expanding market foreign intelligence representation has been recently established in London to provide the General Development Department with close contacts in the European area.

More Intensified Sales Coverage

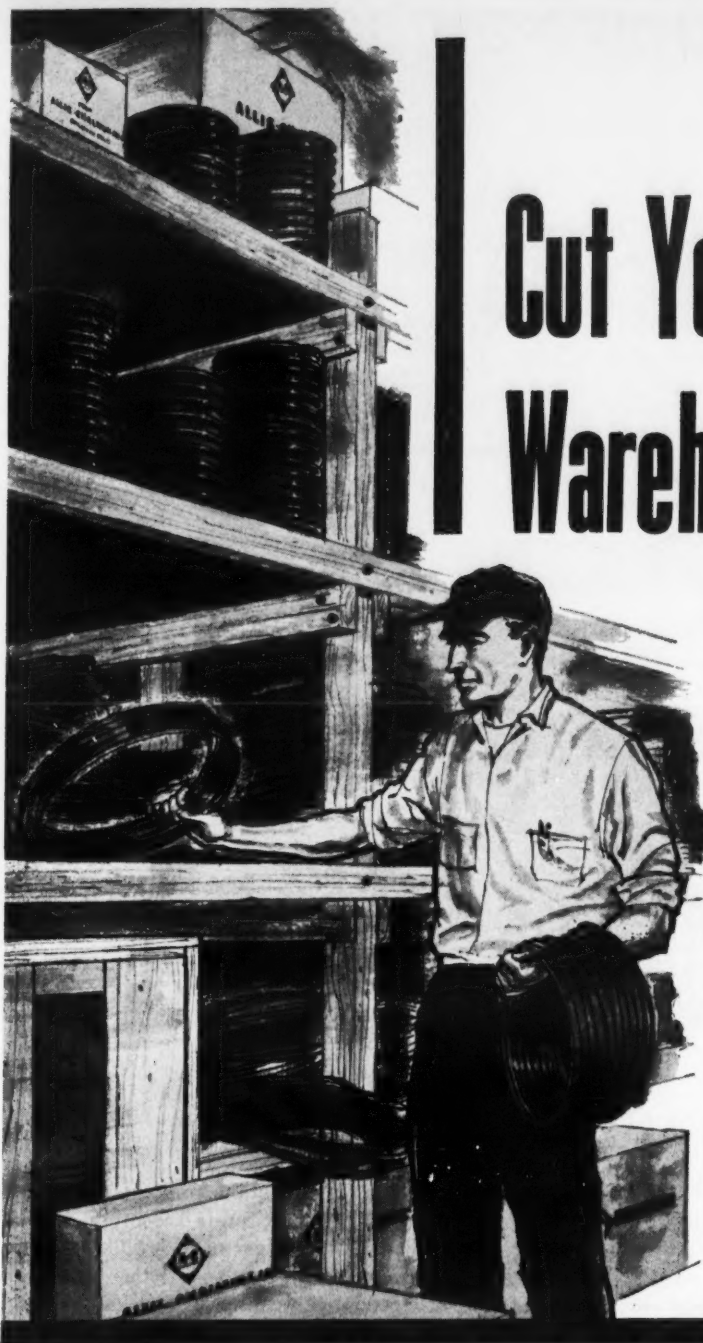
Products reach directly more than thirty segments of U. S. industry with pulp and paper, chemicals, the electrical equipment industry, and the rayon and cellulose industry accounting for about one-third of total sales. With mergers and acquisitions, the sales staff is faced with many new problems. But with more products to sell, greater efficiency is achieved. Reassignment and redistribution of sales people means better coordination and more intensive coverage. Furthermore, better service to the customer is provided. The company can take advantage of specialized knowledge and training of sales people and direct these abilities along given product lines.

Enters Missile Field

Early 1958 saw the establishment of HEF, Inc., a subsidiary jointly owned with Foote Mineral Company to manufacture solid fuel oxidizers for rockets and guided missiles. A new plant is being built near Columbus for the manufacture of ammonium and lithium perchlorates for this purpose, adjacent to Hooker's expanding sodium chlorate and phosphorus pentasulfide manufacturing plant.

Hooker representatives in the top management of HEF, Inc., consist of R. Wolcott Hooker, HEF President; Dr. Geiger, Vice President, and Mr. Bryant, Assistant Secretary.

To next page



Cut Your Warehousing Costs



Use your
Texrope drive distributor
as your warehouseman

Magic-Grip sheaves, *Texrope* belts, *Vari-Pitch* sheaves and motor bases, plus a wide variety of other industrial products — they're always available to you from your *Texrope* drive distributor.

This service means you save the cost of maintaining transmission equipment inventories of your own — costs that include insurance, taxes, handling, space and clerical help.

Let your *Texrope* drive distributor handle your inventory. You'll reduce costs and headaches. You can get his name from your local Allis-Chalmers office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

Here are other services available to save you time and money:

Factory-trained distributor personnel assure you fast and efficient service at all times — in emergencies, you can count on your distributor 24 hours a day.

A-C engineering help backs your distributor, too. For that "special problem," factory engineers work with the distributor.

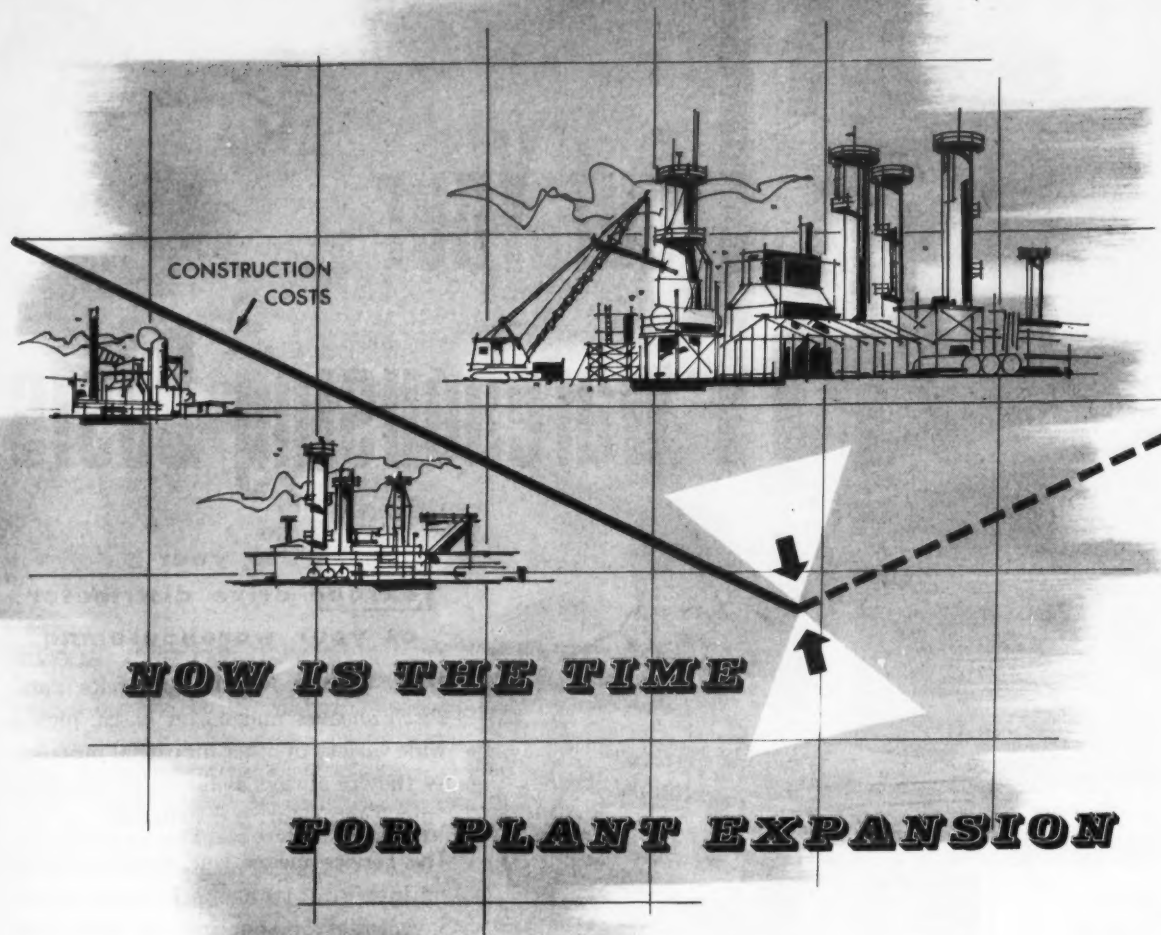
Texrope, *Magic-Grip* and *Vari-Pitch* are Allis-Chalmers trademarks.

ALLIS-CHALMERS



A-5543

Check 1681 opposite last page



Favorable economic factors assure more plant per dollar than at any time in the past or next two years.

Producers of petroleum, chemical and petrochemical products are today faced with a real construction opportunity. Materials of construction are not only more readily available but are considerably less costly. Delivery of many items has also been definitely im-

proved. Labor is more plentiful. All the elements involved in construction costs indicate that now is the time to start building. With most economic forecasters predicting another boom in the near future the producers of petroleum, chemical and petrochemical products are in a position through building now to place themselves in a most favorable economic position.



PROCON *Incorporated*

1111 MT. PROSPECT ROAD, DES PLAINES, ILLINOIS, U. S. A.

PROCON (CANADA) LIMITED, TORONTO 18, ONTARIO, CANADA

PROCON (GREAT BRITAIN) LIMITED, LONDON, W. C. 2, ENGLAND

PROCON INTERNATIONAL S. A., SANTIAGO DE CUBA

WORLD-WIDE CONSTRUCTION FOR THE PETROLEUM,
PETROCHEMICAL, AND CHEMICAL INDUSTRIES

Check 1682 opposite last page

Hooker's 'New Look'

From preceding page

Throughout the broadening of Hooker Chemical Corporation the merging of ideas and effort was apparent. Thus Hooker has built a management team, most of whom are pictured herein.

The Management Team

The newly created Management Committee is headed by Thomas E. Moffitt, President and Committee Chairman; Mr. Murray; Dr. Whitford; Frank W. Dennis, Senior Vice President; Mr. Bryant; R. Wolcott Hooker, Senior Vice President; Mr. Wilkin; and Thomas F. Willers, Vice President, Comptroller and Treasurer. The financial aspects of the business are guided by Mr. Willers, while Mr. Dennis heads the Earnings Improvement Committee.

Eastern chemical sales activities are handled by a six man team: John S. Coey, newly-elected Vice President, Eastern Chemical Sales; William L. Gillespie, Manager-Sales Administration; Robert B. Boyd, Product Manager — Organic Chemicals; James E. Ferris, Product Manager — Inorganic Chemicals; Herbert Heesch, Manager — Field Sales; and James S. Walker, Manager-Technical Service. Alfred W. Hanmer is General Sales Manager, Durez Plastics Division, while John B. Sutcliffe is General Sales Manager, Phosphorus Division. Horace W. Hooker is Western Sales Manager, while John B. Sutherland is Sales Manager for Hooker Chemicals Limited.

Research Team

Research under Dr. Whitford includes the following: Dr. Clarence A. Stiegman, Technical Director; Dr. J. Howard Brown, General Manager, Niagara Research and Development; and Durez personnel, Dr. Walter H. Prahl, Director of Phenol Research and Development; and Dr. Alvin F. Shepard, Resident Manager of the LeRoy Laboratory.

All the above head up the closely knitted team that makes up the "new look at Hooker."

Nylon Waste Disposal

From page 35

the desired 50%. That obtained in the bio-oxidation unit was 85%. Sludge oxygen utilization rate was approximately 50 mg oxygen/hr/gm and sludge volume index values were below 100. There was no doubt that the plant could obtain the efficiency for which it was designed. Pollutants in the processed liquid waste are held to a level which is harmless when discharged into river.

Changes were made in operating variables to observe their effect on efficiency. Loading was investigated from 0.3 to about 4.0 lb BOD/day/lb sludge; mixed liquor suspended solids varied from 800 to 3000 ppm; waste retention in aeration tanks was changed over range of 8 to 12 hr; and recycled effluent for waste dilution was boosted from 0 to 100% of the diluent.

BOD reduction varied from 80 to more than 95%, with maximum reductions obtained at a loading of about 1.0 and waste retention of 12 hr in aeration tanks. Sludge oxygen utilization rates varied from 20 to over 200 mg oxygen/hr/gm of sludge, and sludge volume index changed between 20 and 800.

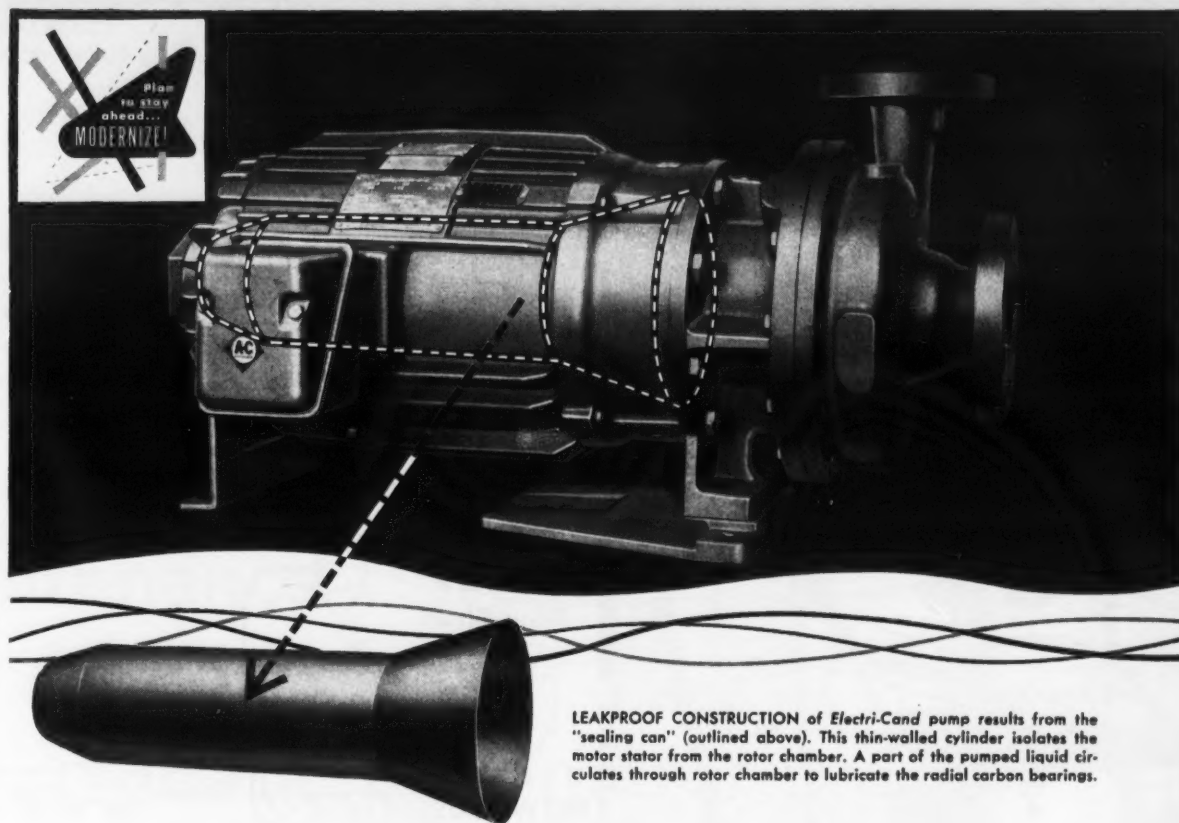
Successful operation of the treatment plant since last fall reflects the success of the development studies. Analysis and scale-up of pilot plant data provided an accurate basis for efficient operation of the waste treatment plant.

As an adjunct to the treatment program, Chemstrand maintains a constant check on rate of flow in river and takes periodic samplings of river water above and below plant site.

(Based on paper presented by the authors at the 13th annual Purdue Industrial Wastes Conference at Purdue University, May 1958.)

Engineering, construction services to chemical industry are described in six-page folder that illustrates various plants and equipment that have been completed. Chemical Engineering Bulletin — Publications Service, Burns and Roe, Inc., 160 West Broadway, New York 13, N.Y.

Check 1683 opposite last page.



LEAKPROOF CONSTRUCTION of Electri-Cand pump results from the "sealing can" (outlined above). This thin-walled cylinder isolates the motor stator from the rotor chamber. A part of the pumped liquid circulates through rotor chamber to lubricate the radial carbon bearings.

New Electri-Cand Pump Just won't leak

Made to order for industrial applications where one drop of liquid loss is dangerous or costly! It's the Electri-Cand pump — developed by Allis-Chalmers.

ROTATING SEALS ARE ELIMINATED in Electri-Cand construction. This means even routine repacking or mechanical seal maintenance is no longer necessary. Overall design also means new

pumping economy and safety in handling clear liquids such as chemicals, acids, alkalis, or poisonous liquids.

Models now in production include ¾ to 15-hp sizes. For additional information, contact your nearby Allis-Chalmers district office, or write to Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Electri-Cand is an Allis-Chalmers trademark.

**Developed
for chemical and
petrochemical
applications**

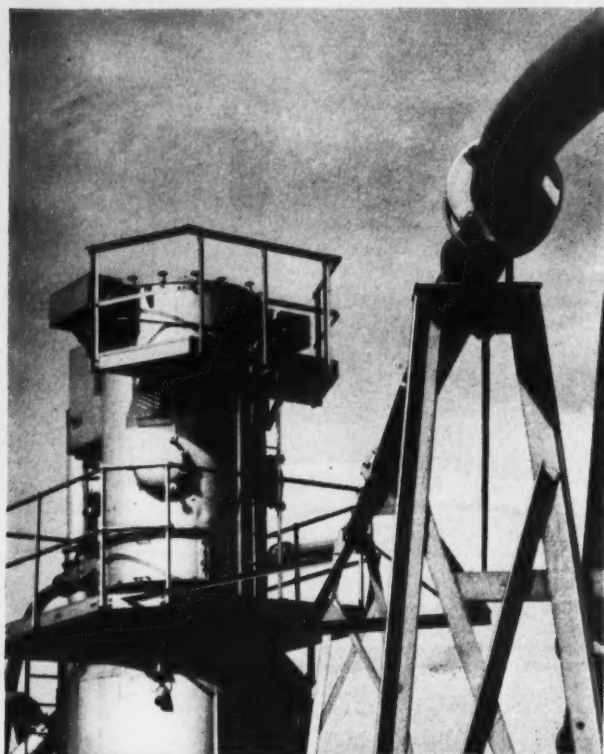
ALLIS-CHALMERS



A-5596

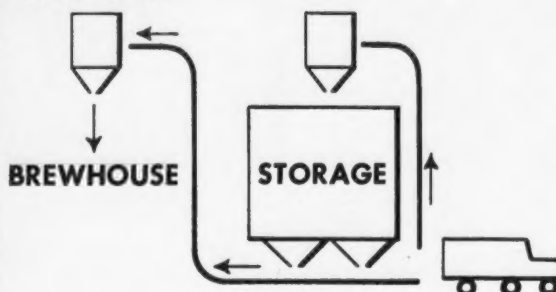
Check 1684 opposite last page

The Arithmetic of Materials Handling

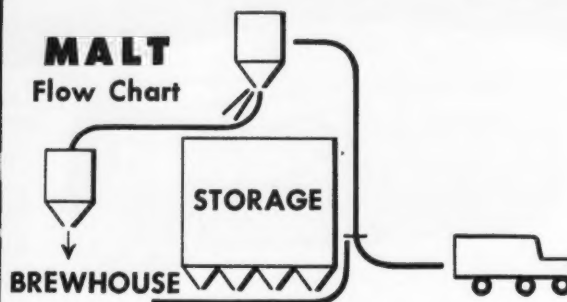


FULLER AIRVEYOR pneumatic system pulls corn grits from discharge of Airveyor bulk transport trailer to storage silos to weigh hoppers.

GRITS Flow Chart



MALT Flow Chart



PIELS MODERNIZES WITH AIRVEYOR.

**saves man-hours,
materials, money**

When Piel Bros., Brooklyn, N. Y., took over the Staten Island plant of another brewery, they replaced complicated, inefficient mechanical conveyors with a fast, efficient Fuller pneumatic Airveyor® system—to handle tons of malt and corn grits.

Here's what the new Fuller Airveyor system has accomplished:

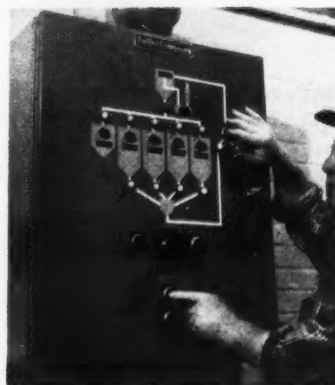
ELIMINATION OF POSSIBLE CONTAMINATION in the old mechanical system. Totally-enclosed Fuller Airveyors prevent material loss through spillage and eliminate the problem of possible infestation. 100% visible dust retention contributes to sanitary working conditions.

MAJOR LABOR-SAVING through fully automatic control of Airveyors. One man

—at pushbutton panel—handles unloading of Airveyor bulk transport trailers, conveying to silos, and directs weighing and proportioning operations.

NEGLECTIBLE MAINTENANCE, because Airveyors have few moving parts and are self cleaning! Downtime for cleaning mechanical equipment previously required eight man hours a week.

If you are now handling dry, granular materials, it will pay you to look into Fuller pneumatic conveying systems. Fuller systems are engineered specifically for your particular application. They bend around corners, run up or down, through walls and floors, almost any distance—even underground. Write or phone today outlining your problem. Fuller will gladly furnish additional information with appropriate recommendations.



THE ULTIMATE in automation—Fuller Airveyor offers simplified, precision control from this remote control "pushbutton" panel.



FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

NUCLEAR NOTES

From page 25

Reactor triples power every 1/2000 sec

Nuclear research reactor, KEWB, upped its power output from zero to 530,000 thermal kw in less than a second during a recent test. This rate of power increase is the largest known to have been experienced safely by a reactor. It amounted to tripling the power every two-thousandths of a second. After power boost, reactor shut itself off without sustaining any damage.

Unit is a 50-kw aqueous homogeneous reactor fueled with a solution of uranium-235. Reactor is operated for AEC by Atomics International, a division of North American Aviation, Inc., Canoga Park, California.

Approval granted for 10 reactors

Construction permit has been granted by AEC to Aerojet-General Nucleonics for 10 research reactors. Known as Model AGN-211, each will have maximum power of 15 watts (thermal). Units will be semi-portable and have plastic cores. They will be of the pool-type, using uranium enriched to 20% in the isotope U-235 as fuel. Reactors are scheduled to be completed by September 1, 1959.



"Honestly, Mr. Blow-decker, you're the freest radical in this lab."



Positive-displacement metering pump at Johns-Manville Corporation plant had to be completely dismantled and cleaned after every operation. Material metered was pitch. Maintenance costs were exorbitant. Now . . . flow is controlled automatically and . . .

reduced maintenance costs

pay for magnetic flow meter system



Here's the magnetic flow meter system that eliminated a continuous problem of costly maintenance. The control valve at left throttles the flow of asphalt according to the signal developed by the magnetic flow meter just below it. The recorder controller for the entire system is at right (arrow)

Problem: After every run, positive-displacement metering pump at Jarratt, Virginia, insulating board plant of Johns-Manville Corporation had to be completely disassembled and cleaned. Asphalt slurry was pumped from the grinders to the sprayers in the board impregnation process. Speed of the pump motor was regulated as a means of controlling flow. Material was a petroleum pitch and water slurry.

Maintenance costs in the continually-present problem of keeping the pump in operation were excessive. Proper cleaning of the pump required that all tar deposits be laboriously removed from every moving part.

Also, the pump-metering system required use of a suction tank, and valuable factory area.

Solution: Installing a magnetic flow meter directly in the asphalt line to meter the flow, the company found that the metering pump and suction tank were no longer needed.

Now . . . a centrifugal pump

feeds the pitch and water slurry from the grinders through the pipe-like transmitter of the meter. Electrodes pick up the small voltage generated by the liquid as it passes through the magnetic field in the tube.

This signal, proportional to

The entire inner surface of the transmitter tube with the exception of the electrodes, is lined with neoprene to prevent short circuiting of the generated voltage. The liner material also serves to resist asphalt buildup and erosion.

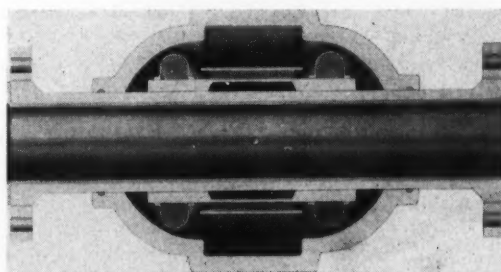
Developed to measure the

A laminated iron core is positioned around the coils to focus the magnetic field in a direction at right angles to the flowing fluid. Voltage generated by the flow of liquid through the magnetic field is detected by the two "point" electrodes, mounted essentially flush with the tube interior.

Remainder of the flow meter system consists of a receiver-controller which supplies 115v 60 cycle power to the magnetic flow transmitter, actuating the magnetic field. The unit also detects the unbalanced voltage developed by the magnetic field, as compared to a reference phase voltage, and amplifies the resultant. The liquid flow is thus controlled and a recording made of the flow rate.

Since the reference voltage source and the flow transmitter are supplied by the same power, voltage changes can occur up to a $\pm 10\%$ line variation without any effect upon instrument calibration. Both voltages change in unison.

Results: In addition to more accurate control . . . automatically . . . and more uniform



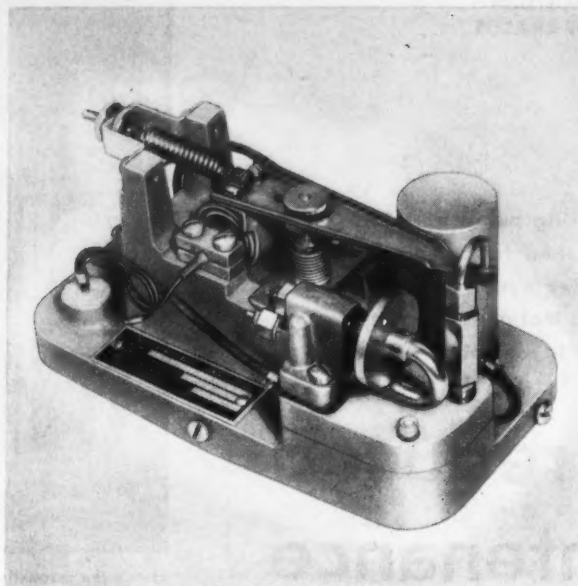
Cross-section of the magnetic flow meter. Stainless steel electrode in center of line detects voltage generated by flow of liquid. Note lack of restrictions in flow line

volume flow rate is then received by a flow controller. Deviations from desired flow rates are automatically corrected by the controller. A control valve in the slurry line is throttled or opened as is necessary.

volume rate of "difficult or impossible" flows, the magnetic flow meter is based on Faraday's law of electromagnetic induction. A uniform magnetic field is produced by two saddle-shaped coils of copper wire in the transmitter.



LOW COST AND EASE OF INSTALLATION PERMIT WIDE USAGE.



OPERATIONAL SIMPLICITY IN A RUGGED, COMPACT UNIT.

TAYLOR ANNOUNCES NEW LOW-COST TEMPERATURE TRANSMISSION

**New SENSIRE* Transmitter: rugged, compact,
force-balance, with mercury-filled system.
Self-compensating for ambient temperatures.**

The new Taylor SENSIRE temperature transmitter now makes more widely available low cost temperature measurement within limits of minus 30°F. to plus 1200°F., with simplified adjustments and excellent repeatability. Available in range spans of 50°F., 100°F., 200°F., and 400°F.

Individual transmitters are factory calibrated in one of four available range spans. A simple thumb-screw adjustment zero-sets the instrument within wide limits. This adjustment is accomplished with high accuracy, and no further calibration is necessary. Factory calibrated accuracy is well within 1% of rated range, below 550°F; 1½% above 550°F.

All SENSIRE transmitters and components are interchangeable (regardless of range). A measuring system encompassing a new range span or new range limits (other than those obtainable with zero adjustment) may be added in the field.

Write for SENSIRE Bulletin 98293, Taylor Instrument Companies, Rochester 1, N. Y., or Toronto, Ontario.

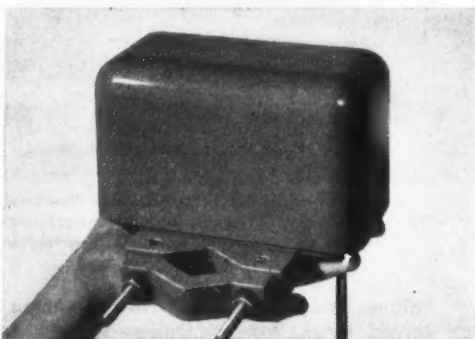
*Trade-Mark

Taylor Instruments
MEAN ACCURACY FIRST

Check 1686 opposite last page



Unusually Fast Response. Due in part to its extremely small bulb, the SENSIRE transmitter has an unusually fast speed of response. However, for processes that require it, the SPEED-ACT* (derivative response adjustment) unit is available. The SPEED-ACT feature is of special value where the bulb is placed in a well, or in processes using material with poor thermal transmission rates.



Easy to install. Mounts in any position. Universal bracket provides for direct mounting on pipe, wall, or wrench head of well or separable bushing. Small and extremely compact, the SENSIRE transmitter measures only 7¾" x 4¾" x 4½"; weighs only 7 lbs.

asphalt impregnation at the Jarratt board mill plant, the new control system makes it possible to utilize valuable space previously occupied by the pump and suction tank.

This saving in space... plus the fact that savings in maintenance costs more than equalled the cost of the flow meter system in two years operation... has caused management to consider use of the same system for control of other board mills within the organization.

(Magnetic flow meter system is product of The Foxboro Company, Foxboro, Mass.)

Check 1687 opposite last page.

Indicating controller has refined modes of control

Yet is said to be in low cost range

Uses: For temperature or pressure control.

Features: Indicating controller has refined modes of control, yet is said to be in low-cost range.

Description: Unit is compact pneumatic controller which can provide not only two-position control but also wide band proportional with or without automatic reset or rate action.

Measuring 8½" square by 4" deep, control can be surface-mounted on equipment, or flush-mounted on panelboards. Unit can also be mounted directly on pneumatic-operated valves that it positions. Measured variable is indicated on 3½" precision gage dial. Red circle-tip pointer indicates knob-adjusted set-point on same dial.

Variety of thermometer bulbs are offered for temperatures from -350°F to +1000°F. All thermal elements are interchangeable with pressure measuring elements.

Basic element for pressure ranges from 0-15 psi to 0-1000 psi is a pre-calibrated Bourdon tube.

Controller can be adapted

To page 108

THAT'S INTERESTING

Air safety

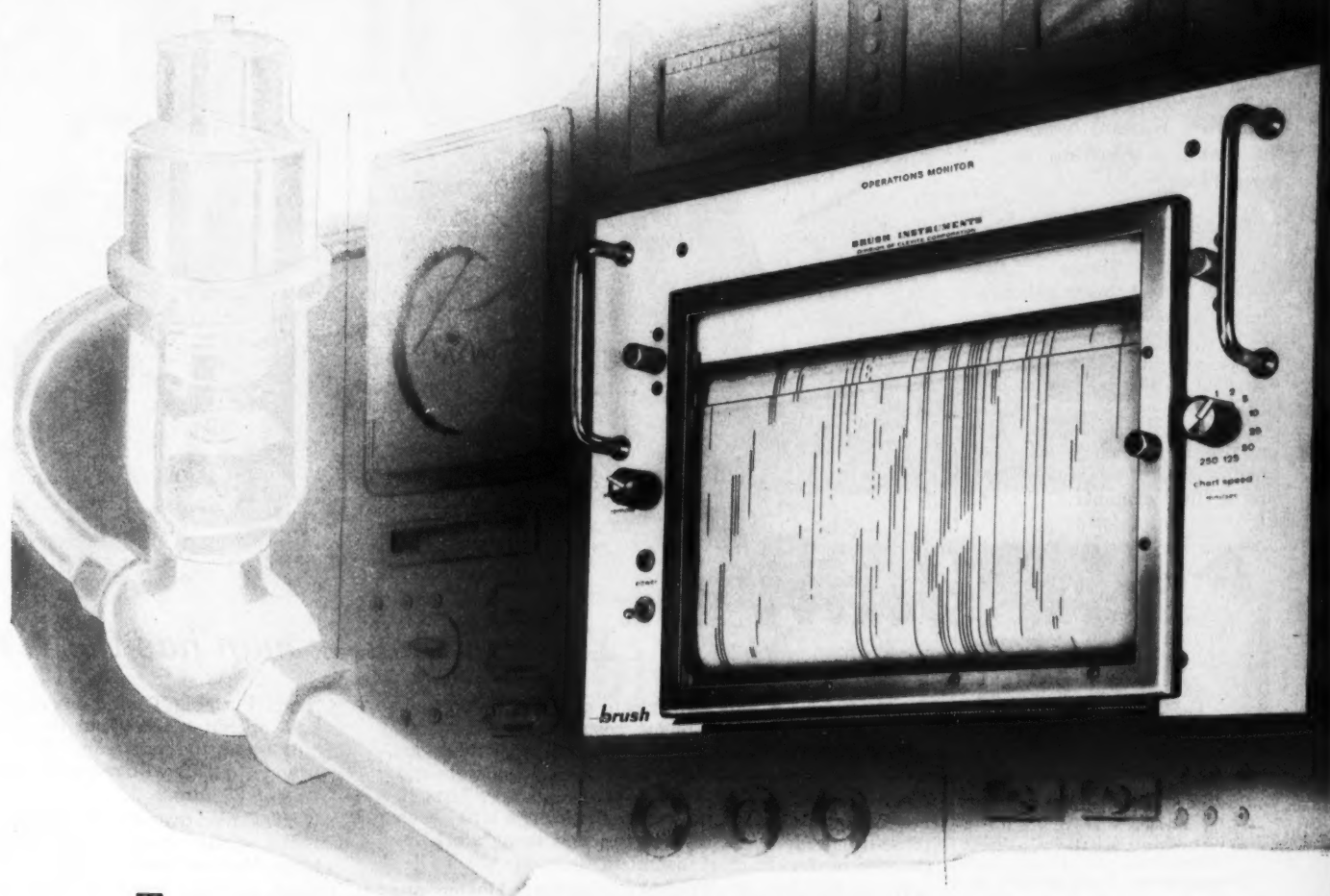
Impure air in the plane cockpit is one possible cause of aircraft crashes. Contaminants such as hydrocarbons from a leaky fuel system may cause sluggishness in the pilot reactions. A hydrocarbon detector has been designed for the Air Force by Stanford Research Institute. The unit has a selectivity not heretofore attainable by simple means. (SRI Journal, Stanford Research Institute)

Supertanker

Displacing 109,830 tons compared to 78,043 of the SS Queen Elizabeth, the SS Harold H. Helm ranks as the world's largest oil tanker afloat. An all-welded tanker with a cargo deadweight capacity of about 85,600 long tons, the ship was built by National Bulk Carrier at its Kure Shipyards Div. in Japan. (Heat Engineering, Foster Wheeler Corp.)

For more information on product at right, specify 1688 see information request blank opposite last page.

100 processes recorded on One Brush Operations Monitor!



This compact Brush Operations Monitor can improve the control of power distribution systems, chemical processes and automated production lines.

On a moving chart only 12" wide, 100 separate operations can be recorded at the same time . . . what happens or doesn't happen . . . monitoring present recording and indicating devices. For example, the opening or closing of a valve . . . the

action of a relay . . . the control of motors . . . all are documented in a time relationship to other operations. You get an immediate picture of an *entire situation* at any time. Sixteen different time bases can be selected from remote or on-the-spot locations.

Write to Brush for details. Engineering assistance is available at all Brush factory branches, strategically located throughout the United States.

brush INSTRUMENTS

3405 PERKINS AVENUE

DIVISION OF
CLEVITE
CORPORATION

CLEVELAND 14, OHIO

From page 106

for measurement or use on other process variables — liquid level, differential pressure or flow, specific gravity, and so forth.

Accuracy is 1% in middle half of scale. Sensitivity is less than 0.1% at 100% proportional band.

(Pilot indicating controller is product of U.S. Gauge Division, American Machine and Metals, Inc., Moline, Illinois.)

Check 1689 opposite last page.

Monitors radioactivity of isotopes emitting soft-Betas

Electrometer useful for industrial gases

Uses: As low-level radioactivity measuring instrument for radioactive gases, solids, or liquid samples. Unit can be used for industrial gas monitoring system.

Features: Electrometer can be used to count samples manually or continuously, using a "flow chamber."



Components of electrometer. Ion chamber is at left

Description: Instrument is based on principle that radioactive sample in ion chamber produces "ion current" exactly proportional to sample activity. This minute proportional current is amplified for reading on a panel meter or chart recorder.

Greatest utility has been found so far in measurement of gas samples. Chemical and biological samples labeled with carbon-14 are converted to carbon dioxide. The CO₂ is collected in evacuated ion chamber. When ion chamber is filled, it is placed on con-

What's the best way to heat a tank?



Your Chromalox man has the **ANSWER**

Trying to heat a tank with steam or combustible fuels often presents rough problems, costs needless time and money and leads to ineffective results. But 97 times out of 100 there is a quick and effective electric answer—and your "CHROMALOX man with the answers" has it. Here, for example, are five ways of heating a tank—each presenting significant advantages, and using stock industrial heaters in most instances.

- In the foreground, CHROMALOX Strip Heaters are clamped to the tank wall, heating by conduction, without contacting the tank contents. Tank interiors have full work space—cleaning is simplified.
- Moving clockwise: CHROMALOX Screw-Plug-Immersion Heaters, with standard pipe threads, go to work quickly in heating water and corrosive solutions. Heavy-duty elements of steel, copper, stainless steel, or alloy, all in correct watt density, have proper chemical characteristics.

- Next: Portable Tank Immersion Heaters require no tank openings. They put the heat down to the very bottom of the tank—and they are constructed for trouble-free life with moisture, heat, and acid-resistant parts and joints.
- Next: Coiled over-the-side heaters, for full but shallow tanks, produce good circulation and uniform temperatures. Various sheaths resist practically all chemicals.
- Next, at right front: a High-capacity Flange-Type Heater packs many kilowatts in a small space, particularly in water solutions. The heavy-duty flange simplifies installation.

So what's YOUR heating problem? Just call your CHROMALOX representative, listed opposite. He has the fast, clean, safe, accurate, economical ELECTRICAL ANSWER, backed by the world's largest stock of industrial electric heaters for immediate shipment, plus factory design engineering services.

CHROMALOX® Electric Heat

Edwin L. Wiegand Company

7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania • CHURCHILL 2-6400

Check 1690 opposite last page



Call Chromalox

for the man with the
ELECTRICAL ANSWERS
to your heating problems

ATLANTA 9, GA.
Applebee-Church, Inc.
1889 Peachtree St., N.E.
Trinity 5-7244

BALA-CYNWYD, PA.
J. V. Calhoun Co.
349 Montgomery Ave.
MOhawk 4-6113

BALTIMORE 18, MD.
Paul B. Renoff Co.
333 E. 25th St.
HOPkins 7-3280

BINGHAMTON, N. Y.
R. P. Smith Co., Inc.
2507 James Street
Phone 4-7703

BLOOMFIELD, N. J.
R. L. Faber & Associates, Inc.
1246 Broad Street
EDison 8-6900

BOSTON 11, MASS.
Lee C. Pelkus and Co., Inc.
683 Atlantic Ave.
Liberty 2-1941

BUFFALO 2, N. Y.
Niagara Electric Sales Co.
505 Delaware Avenue
SUmmer 4000

CHARLOTTE 2, N. C.
Ranson, Wallace & Co.
116 1/2 East Fourth St.
EDison 4-4244

CHATTANOOGA 1, TENN.
H. R. Miles and Associates
P. O. Box 172
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CHICAGO 5, ILL.
Fred I. Tourtelot Co.
407 S. Dearborn Street
HARRison 7-5507

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The Smyser Company
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TRinity 1-0605

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P. O. Box 1376
Phone 3-7706

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Anderson-Bolds, Inc.
202 W. 25th Street
PHospect 1-7112

DALLAS 25, TEXAS
L. R. Ward Company
3009-11 Canton Street
Riverside 1-6279

DAVENPORT, IOWA
Volco Company
215 Kahl Bldg.
Phone: 3-2144

DENVER 2, COLO.
E. & M. Equipment Co.
2415 15th Street
Glendale 5-3651
GEnesee 3-0821

DES MOINES 14, IOWA
Midwest Equip. Co. of Iowa
842 Fifth Avenue
CHerry 3-1203

DETROIT 38, MICH.
Carman Adams, Inc.
15760 James Couzens Hwy.
UNiversity 3-9100

HOUSTON 3, TEXAS
L. R. Ward Company
3605 Polk Avenue
CApital 5-0356

INDIANAPOLIS 4, IND.
Couchman-Conant, Inc.
627-631 Architects &
Builders Bldg.
MEtrore 5-5313

KANSAS CITY 6, MO.
Fraser D. Moore Co.
106 E. 14th Street
VICTor 2-3306

LOS ANGELES 15, CALIF.
Montgomery Brothers
1053 South Olive Street
RICHmond 7-9401

MIDDLETOWN, CONN.
Dittman and Greer, Inc.
33 Pleasant Street
DIamond 6-9606

MILWAUKEE 3, WIS.
Gordon Hatch Co., Inc.
531 W. Wisconsin Avenue
BRoadway 1-3021

MINNEAPOLIS 4, MINN.
Volco Company
831 South Sixth Street
FEderal 3-3373

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H. R. Miles and Associates
2500-B Franklin Road
CYpress 2-7016

NEW YORK CITY, N. Y.
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WORTH 4-2990

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Midwest Equipment Co.
of Omaha
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ATlantic 1600

PHILADELPHIA, PA.
See "Bala-Cynwyd, Pa."
GRGreenwood 3-4477

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Woessner-McKnight Co.
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ATlantic 8-8758

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Niagara Electric Sales Co.
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HAMILton 6-2070

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Room 211 Derby Building
352 N. Broadway
AMherst 2-5647

INSTRUMENTS & LAB

verter for determination of total sample activity.

Carbon-14 sample preparation and activity determination are reproducible to $\pm 0.75\%$ using instrument. With tritium samples accuracy is said to be $\pm 1\%$.

(Model 6000 Dynacon electrometer is product of Nuclear-Chicago Corporation, 223 West Erie St., Chicago 10, Illinois.)

Check 1691 opposite last page.

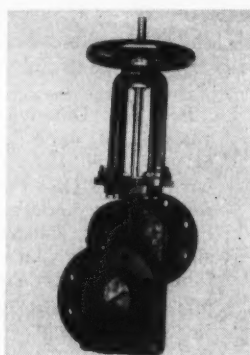
Non-plugging valve will handle flow of pulp stock

Controlled turbulence is key
to operation

Uses: For flow control of
pulp stock and other slurries.

Features: Manually-operated
valve is non-plugging.

Description: Valve has Z-shaped body which creates a controlled turbulence. Particles are thus kept in suspension and a diamond-shaped port prevents plugging at



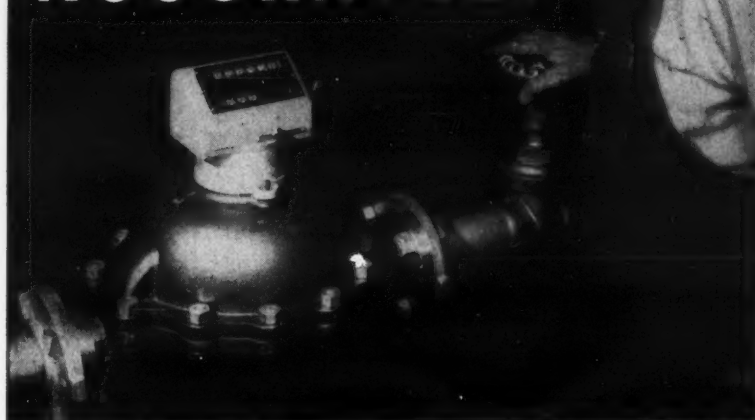
This Z-shaped body keeps particles in suspension

small valve openings. Valve is offered with either an iron or stainless steel body, both having a stainless steel gate and stem. Connection sizes are 3 inches, 4 inches, 6 inches, 8 inches, 10 inches, and 12 inches with flat face ASA flange drilling.

(Ratogate Valve is product of Fischer & Porter Company, 753 Jacksonville Rd., Hatboro, Pennsylvania.)

Check 1692 opposite last page.

Measure CORROSIVE LIQUIDS ACCURATELY



with NIAGARA Displacement Meters

Now you can apply the extreme accuracy of Niagara Meters to the measurement of corrosive liquids. Niagara Chemical Meters of Type 316 stainless steel offer good resistance to corrosion and can be used to measure caustic soda, most acids, fruit juices and similar liquids. Available in sizes 3 to 110 G.P.M. or in intermittent use up to 160 G.P.M. Niagara Chemical Meters are also available for automatic liquid measurement and liquid flow control in hazardous or non-hazardous atmospheres.

If you have corrosive liquid metering problems, let us help you. Mail coupon today.

BUFFALO METER CO.

2892 Main Street
BUFFALO 14, NEW YORK

Please send me information on the complete line of Niagara Meters.

Liquid.....
Flow g.p.m..... Temp.....°F
Name.....
Company.....
Address.....

Check 1693 opposite last page

**15-to-1
Turn Down
with
Uniform
Accuracy**

NEW
kates
TYPE "F"
FLOW RATE REGULATOR



**NEW
IMPROVED
DESIGN**

MORE ACCURATE —

Both in flow control and set point adjustment

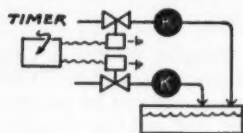
MORE ADAPTABLE —

For a wider variety of liquids and applications

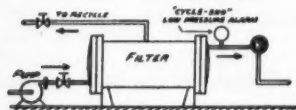
MORE FLEXIBLE —

With 15 to 1 turn down

TYPICAL APPLICATIONS



Batch process measurement



Pressure filtration control

DON'T BUILD A SYSTEM —

INSTALL A



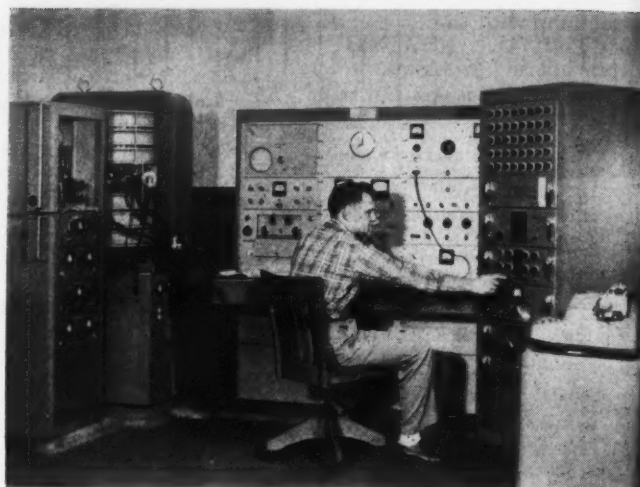
THE W. A. KATES COMPANY

Department O
430 Waukegan Road
Deerfield, Illinois

Get full details and description—
write for New Bulletin No. 581

A 15-to-1 "turndown" with a twist of a dial is now possible with the all-new, improved TYPE "F" Regulator—a direct-acting, self-contained unit that automatically measures and controls fluid-flow regardless of variations in supply or discharge pressures. Quickly and easily installed, it performs all the functions of a complete fluid-flow control system. Set the desired flow rate on the direct reading, uniformly graduated 160° dial... then forget it! The TYPE "F" Regulator does the rest. Kates TYPE "F" Regulators offer greater accuracy, handle a wider range of liquids with greater stability, yet faster response than ever before! Economical—their ultra-simple design, rugged construction features mean longer life, less service needs. Standard units are rated from 0.02-0.20 to 100-550 GPM. Special units can be supplied for unique applications.

**PROCESS INSTRUMENTATION
and LABORATORY APPARATUS**



Analog-to-digital converter working in conjunction with analytical mass spectrometer speeds up analytical work at Gulf Oil Company's Port Arthur, Texas, refinery. Inlet system cabinet and magnet assembly for mass spectrometer are at left. Mass spectrometer console is center. Operator adjusts converter at right

**Automatic digitizing
speeds petrochemical analyses**

Problem: Detailed chemical analyses of various mixtures of gases and light hydrocarbons at Gulf Oil's Fort Arthur Refinery are important factors in achieving satisfactory results. Several years ago, the Refinery's Analytical Laboratory placed in service a mass spectrometer and two analog computers to expedite analytical results.

The original installation was followed by a second instrument of later design which also had a capacity for high mass work. Because the translation of recorded instrumental data into analytical results is the most time-consuming step in a chain of analysis, time requirements of this translation presented a real problem.

Gulf Oil's Port Arthur Refinery nominally processes 270,000 barrels of crude per day. Facilities for the manufacture of chlorine, nitrogen,

oxygen, caustic soda, sulfuric acid, and anhydrous aluminum chloride are also part of the installation. Within the last few years the scope of the refinery has been expanded to include large scale manufacture of petrochemicals, such as ethylene, isooctyl alcohol, propylene polymers, aromatics, and sulfur.

Solution: As a step toward use of automatic high-speed computers and translation of recorded instrumental data into completed analytical results, an analog-to-digital converter was purchased. The instrument receives data directly from the spectrometer and converts them into digital form for automatic tabulation by electric typewriter or IBM punch.

The advantages of mass spectrometry for light hydrocarbon analyses are well known, particularly as regards the small samples required,

Check 1694 opposite last page

speed, versatility, and reliability. Normally a sample is admitted through an inlet system, and the conglomerate mixture of molecules then passes through a fine orifice and restriction slit into an ionization device. Ions which are formed by a controlled electron bombardment are accelerated electrostatically through a second slit, and are diverted into circular paths by means of a controlled magnetic field. Radii of such ion paths are proportional to their mass-velocity relationship.

By varying the acceleration, ions of different mass can in turn traverse the fixed semi-circular path from ionization chamber to collector and give up their electrical charges to a target. The charges are amplified and electrical currents proportional to ion abundance are automatically scanned and digitized by means of the sequential analog-to-digital converter (Spectrosadic).

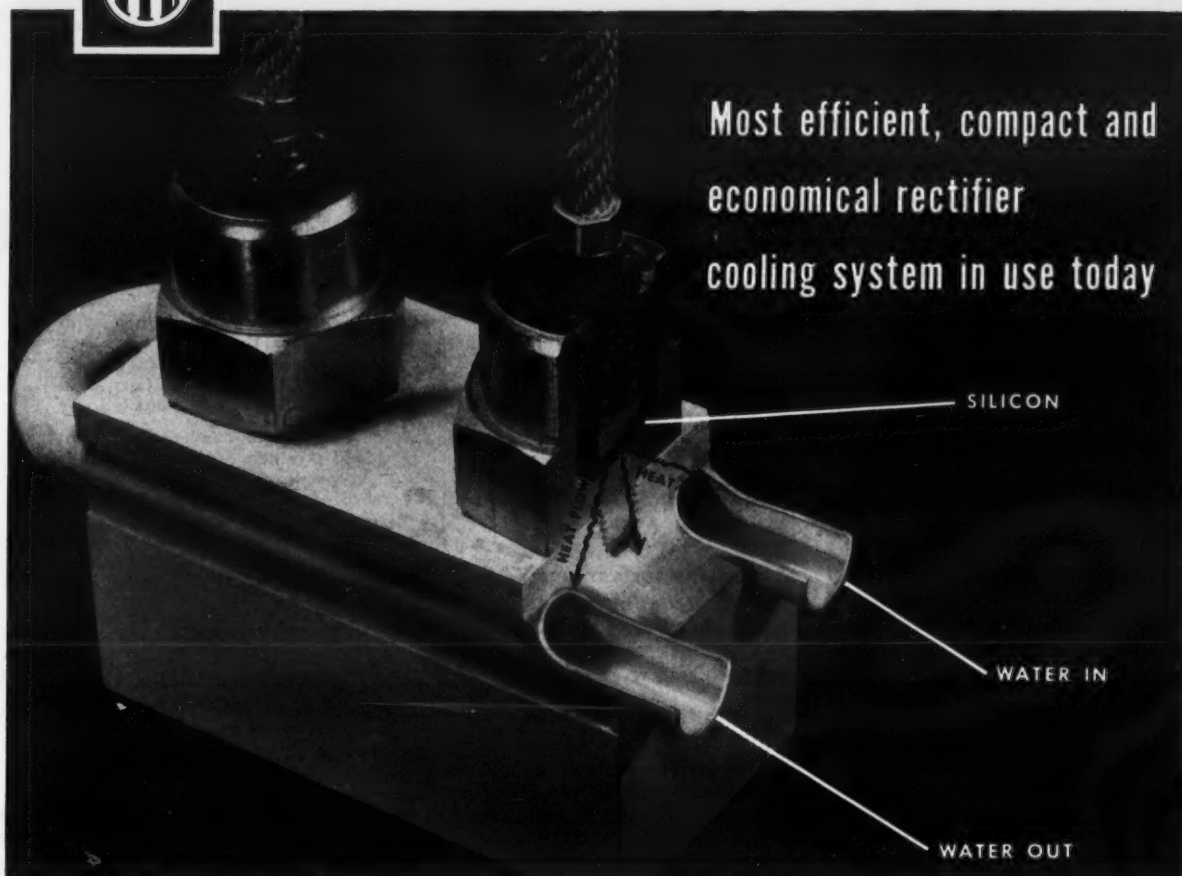
Data Treatment

Increasing analytical load and the desire for uninterrupted analytical service has promoted the following chain of development in data treatment. At the outset an analog computer which had the capacity for handling twelve simultaneous equations was selected to complement the use of desk calculating machines to process analytical data. Two of these computers in conjunction with two mass spectrometers having Spectrosadics were adequate until recent analytical load made desirable greater capacity.

Results: When an IBM 650 computer was installed at the refinery, the laboratory department was prepared to take full advantage of the ability of the analog-to-digital converter system to record analytical data and to punch cards providing data input for the computer. Not only does the high speed computing equipment afford more rapid translation of analytical data to actual analytical results, but additional corollary information, such as specific gravity, molecular weight, heat of combustion, weight and liquid



UNITRON SEMI-CONDUCTOR RECTIFIER



Section of bus bar... showing how cooling water flows close to cells for efficient cooling. Bus bar can be as long as necessary to hold the number of cells needed for the required current. Cells can be changed fast and easy without need to drain cooling system or shut down rectifier.

Just in the cooling system alone, the I-T-E UNITRON Semi-Conductor Rectifier saves you money. First, it costs so little to operate. Second, it takes little space. Third, it prolongs average cell life.

Uses ordinary tap water. No coolant is more efficient than water... none more economical than tap water. The I-T-E UNITRON takes ordinary tap water and continuously purifies it... deionizes it... to protect the system from corrosion and prevent electrical leakage. The resultant water is virtually a non-conductor of electricity.

The I-T-E UNITRON water cooling system eliminates the need for power-eating

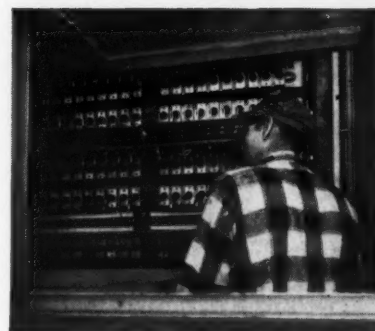
blowers and space-eating ducts. It saves the cost of special coolants and the danger of skin irritation to personnel.

Cooling water flows through the solid copper bus bar, close to the rectifying cells. Each cell is cooled to the same temperature. And since there are no hot cells, there are fewer cell failures.

This unique water cooling system is only one of the reasons the I-T-E UNITRON was chosen for the first 25 to 60 cycle reconversion by a large chemical plant in the Niagara area.

The I-T-E UNITRON can be built in any desired d-c voltage and current rating. For complete information, contact your local I-T-E representative. Or write

I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 19th & Hamilton Sts., Philadelphia 30, Pa.



I-T-E CIRCUIT BREAKER COMPANY

Check 1695 opposite last page

Have to
MATCH COLORS
Exactly?



DEPEND ON
FISHER
DAVIS-BRUNING

COLORIMETER

THE COLOR MEMORY FOR INDUSTRY



Have to get a color exactly? And keep it once you have it? Fisher Scientific's development engineers have found the answers in the Davis-Bruning Colorimeter. It translates any color, in any product, into a permanent numerical formula that can be converted back into the original color whenever an exact re-match is wanted. The Colorimeter has broad applications in paint, food, textile, paper, plastics, printing, ceramics and other fields requiring exact color control.

Stops Color Drifting

Standardizes by Formula

Eliminates Long Calculations

Measures Color Differences

Tests Color Blindness



B-36a

WANT TO KNOW MORE?

Send for the 8-page booklet which details the how and why of the Davis-Bruning Colorimeter. You'll find it helpful.

103 FISHER BLDG., PITTSBURGH 19, PA.



**FISHER
SCIENTIFIC**

IN THE U.S.A. Chicago Philadelphia IN CANADA
Boston Cleveland Pittsburgh Edmonton
Buffalo Detroit St. Louis Montreal
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America's Largest Manufacturer-Distributor of
Laboratory Appliances & Reagent Chemicals

Check 1696 opposite last page

INSTRUMENTS & LAB

percents, is readily available with no additional operating effort. A high percentage of the light hydrocarbon analytical load is now processed through this route.

By use of associated IBM equipment, typewritten analytical reports are prepared daily for distribution to the various operating units with very few minor editorial corrections.

(Spectrosadics, mass spectrometers, and analog computers are products of Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, California.)

Check 1697 opposite last page.

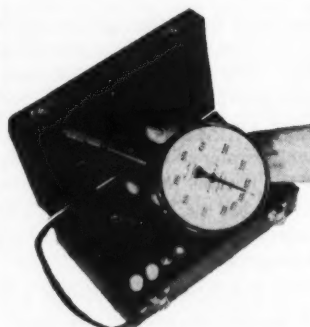
Precision tachometer is easy reading

Accuracy is $\pm 0.25\%$ of full scale reading

Uses: Accurate speed measurements in laboratories, quality control or production tests.

Features: Hand tachometer is especially designed for particularly accurate speed measurement. Accuracy is $\pm 0.25\%$ of full scale reading.

Description: Dial diameter is 4.7". Scale calibration is open and easily readable. Drive shaft is equipped with



Single-range tachometer reads with good accuracy

ball bearings and instrument is supplied with two large rubber-mounted male and female centers, an extensive shaft and center, oil container and dropper. Range of the single-range instrument can

REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER

With free air the cooling medium you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This air-cooled condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often make a profit on recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact,



Niagara Aero Vapor Condenser. This compact machine may be installed directly above stripping column or vacuum evaporator.

easily maintained unit replacing both cooling tower and barometric or surface type condenser.

Maintenance expense is low. Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

Constant temperature, uniform products and maximum production 12 months a year are assured. Unit capacities up to 15 million BTU.

Write for full information. Ask for Bulletin 129R

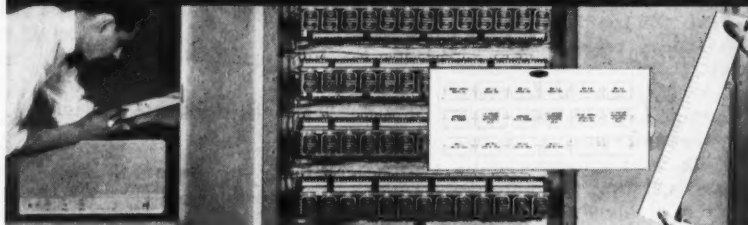
NIAGARA BLOWER COMPANY

Dept. CP-10, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 1698 opposite last page

PROCESS INTERRUPTIONS REPORTED and RECORDED



New PANALARM Recording Annunciator Uncovers Profit Leaks

- Pinpoints temperature, flow, pressure and level process trouble areas by accurately, instantly recording off-normal operations.
- Permanent, unalterable statistical data helps prevent downtime repetition.
- No time-wasting decoding. Directly readable digital form.

Model RA helps attain highest quality products by continuously monitoring all process variables. Also helps reduce downtime, maintenance and operating costs in your plant. Write for Bulletin 102 today.



PANELLIT, INC.

7401 No. Hamlin Ave., Skokie, Ill.

Check 1699 opposite last page

CHEMICAL PROCESSING

be from 1000 to 6000 rpm. Other ranges up to 30,000 rpm can be supplied.

(Cat 235 tachometer is product of James G. Biddle Company, 1316 Arch St., Philadelphia 7, Pa.)

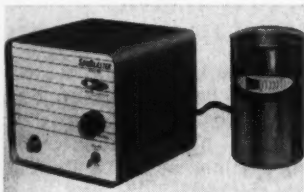
Check 1700 opposite last page.

Ultrasonic processor is lab size

Portable processing unit said to be low-cost

Uses: As laboratory-size ultrasonic process machine for investigating applications of ultrasonics in homogenization, acceleration of chemical reactions, radio-active decontaminations, cleaning, and so forth.

Features: Ultrasonic processor is portable and said to be in low-cost range.



Ultrasonic process machine for laboratory

Description: Equipment consist of ultrasonic generator and stainless steel transducerized tanks of 1/8 or 3/8 gallon capacity. Power used is 115 volt 60 cps. Ultrasonic power output is 35 watt average, 140 watt pulse at 90 KC. Weight of generator is approximately 10 pounds. Tanks are 7 inches in height. Tank diameters are 3 5/16" or 4 7/8".

Units are available with duty cycle timers.

(Series 200 SonBlaster is product of Narda Ultrasonics Corporation, 118-160 Herricks Road, Mineola, New York.)

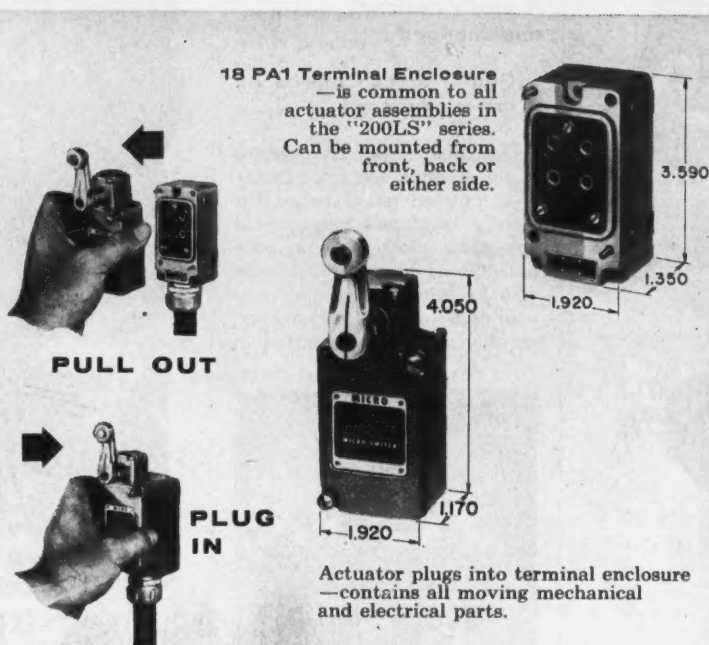
Check 1701 opposite last page.

Flow rate calibration services are discussed in illustrated six-page Bul 1361—Cox Instruments Div., George L. Nankervis Co., 15300 Fullerton Avenue, Detroit 27, Michigan.

Check 1702 opposite last page.



MICRO SWITCH Precision Switches



NEW...

"Plug-in Limit" Switch cuts costly downtime

*Compact sealed enclosures
with choice of 6 actuators
meet wide range of industry needs*

Here's a precision limit switch you can replace complete in 20 seconds! Downtime is all but eliminated!

The switch enclosure of this new "Plug-in Limit" switch, in any of six actuator styles, plugs into the terminal enclosure like a radio tube... is precisely positioned by dowel pins and secured by two No. 10 screws. Together, the two parts form a complete unit, sealed against oil, water, dirt and dust.

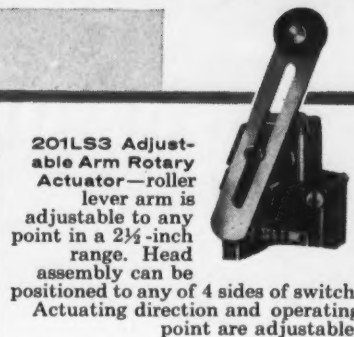
The "Plug-in Limit" is two-circuit double throw. Electrical rating is 10 amps. 120, 240, 480 vac; 1/2 H.P. 120 vac; 1 H.P. 240 vac; 0.8 amp. 115 vdc; 0.4 amp. 230 vdc;

0.1 amp. 550 vdc. Pilot duty rating is 600 vac max. Meets NEMA Industrial Control Standards.

Authorized distributors everywhere maintain stocks. MICRO SWITCH technical specialists are available at the sales office near you. For details of the new "200LS" Series, send for Catalog 83.

MICRO SWITCH... FREEPORT, ILLINOIS
A division of Honeywell
In Canada: Honeywell Controls, Ltd.,
Toronto 17, Ont.

The two-word name MICRO SWITCH is NOT
a generic term. It is the name of
a division of Honeywell.



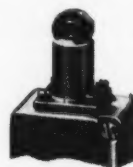
201LS3 Adjustable Arm Rotary Actuator—roller lever arm is adjustable to any point in a 2 1/2-inch range. Head assembly can be positioned to any of 4 sides of switch. Actuating direction and operating point are adjustable.



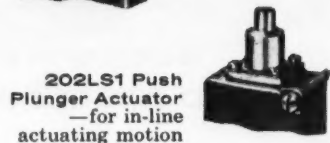
208LS1 Coil Spring Actuator—flexible spring actuator for multi-direction operating motion



201LS10 Rod Actuator—provides light actuating force. See adjustability details under 201LS1 below



205LS1 Roller Plunger Actuator—adjustable at 90° angles



202LS1 Push Plunger Actuator—for in-line actuating motion



201LS1 Roller Arm Actuator—field adjustable for actuation clockwise, counter-clockwise, or in both directions. Arm is adjustable through 360°. Head can be faced in any of four directions.



Honeywell

MICRO SWITCH PRECISION SWITCHES

Check 1703 opposite last page

Look for the name of MICRO SWITCH
Authorized Distributors in the Yellow Pages

GUARANTEED
against stem leakage*

*from non-critical vacuum to 10,000 psi



SERIES 100 FORGED NEEDLE VALVES

Hoke presents the Series 100—a new line of full-flow, general purpose valves especially designed for water-oil-gas application and guaranteed against stem leakage from non-critical vacuum to 10,000 psi! Here you'll find traditional Hoke quality combined with such unusual features as the exclusive Hoke nylon stem wiper. Offered at a truly competitive price.

HOKE

SEE NEXT PAGE FOR
INSIDE STORY ON THIS
VERSATILE NEW VALVE!

INSTRUMENTS & LAB

Graphic control board is easily revised and changed

Graphic section can be re-drawn as desired

Designed to permit changes of the graphic section, recently-completed panel board for water treatment equipment has glass cloth graphic section. Separate controls tie-in visually with lights as in conventional design. However, graphic section is mounted in



Flow is shown by indication lights

center of panel and process components are shown schematically.

Although the electrical control panel is to be used to operate water treatment equipment at a power station, similar panels can be devised for both larger and smaller boards. Space has been left for addition of components to expand capacity of water treatment installation. Flow is shown by means of indication lights.

(Graphic panel for water treatment plant is product of Illinois Water Treatment Company, Rockford, Ill.)

Check 1704 opposite last page.

Liquid level sensor

Details of liquid level sensor which employs a radioactive material in sensing element are contained in Bul RF-581—Aeronautical and Instrument Div., Robertshaw-Fulton Controls Co., Anaheim, California.

Check 1705 opposite last page.

**PROTECT
SKIN**

AGAINST
• ACIDS
• ALKALIS
• FUMES
• IRRITANTS
WITH

**"KERODEX" BARRIER
CREAM**

"THE MIRACLE SECOND SKIN OF INDUSTRY"



**HANDS
UNHARMED BY
HYDROCHLORIC
ACID
BATH**

Hands immersed in hydrochloric acid for 60 seconds. "Kerodex" 71 gave absolute protection to the skin.

**"KERODEX" SAVES CLAIMS,
INJURIES, LOST TIME...**

INCREASES PRODUCTION IN MANY PLANTS

"Kerodex" Barrier Cream fits the skin like an invisible glove—is as strong and elastic as the skin itself. Protects workers from skin injuries, job hazards. "Kerodex" is nongreasy...nonsmeary...does not affect materials handled. Now being used by thousands of industrial plants to save skin injuries, claims.



"KERODEX" 71...
protects against water, and water-soluble irritants—acids, alkalis, emulsified cutting oils, plating solutions, epoxy resins, amine hardeners, chromate salts, etc.

"KERODEX" 51...
protects against water—insoluble irritants—dyes, spirit, glues, paint, resins (other than epoxy), glass fiber laminates, rubber solutions, graphite, tar, poison ivy, oak and sumac, etc.

**NOW TEST
"KERODEX"
IN YOUR PLANT WITH THIS
INTRODUCTORY OFFER**
12—4 oz. tubes "Kerodex"
(approximately 60 applications per tube)
type 51 or type 71
ONLY \$10.80 post paid
(\$18.00 list value)



"KERODEX"

is manufactured by
AYERST LABORATORIES
22 East 40th Street, New York 16

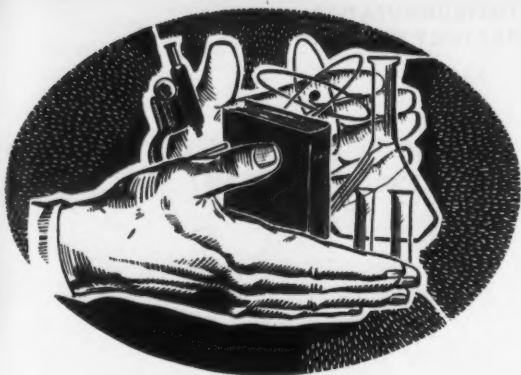
AYERST LABORATORIES
22 East 40th Street, New York 16, N.Y.

Please ship
..... dozen tubes, "Kerodex" 71 dozen tubes, "Kerodex" 51

TO: Name of Company.....
Address.....
City..... State.....
Attention of: Name..... Title.....
Money order or check enclosed in the amount of \$.....
☐ Please bill us 5883

Check 1706 opposite last page

CHEMICAL PROCESSING



an entire research library in your hands ... with MICROCARDS*

There are countless applications of MICROCARDS in every field of science. With MICROCARDS, you can have, at your fingertips, reference data not otherwise available — foreign journals, exhaustive government research reports, limited-edition monographs — on easy-to-use, easy-to-read cards. They do not smear when handled, and the image remains sharp, clear and legible indefinitely.

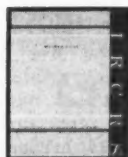
* A registered trademark. A MICROCARD is an opaque 3" x 5" card on which we record photographically, in miniature, as many as 80 pages of full-size documents. You can keep a complete library at hand in an ordinary card file, locate particular references easily and read them clearly ... with a magnifying MICROCARD reader. A great amount of original source material is already available from MICROCARD publishers. Their current catalogs are available to you on request.



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Write today for more information what's now available on MICROCARDS, where you can get your own material converted to MICROCARD FORM.



Check 1707 opposite last page

OCTOBER 1958

INSTRUMENTS & LAB

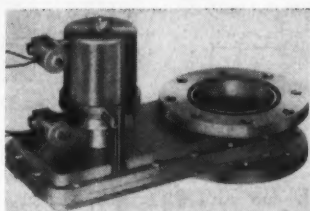
Opens or closes valves in a fraction of a second

Valve operator permits manual operation

Uses: As valve operator and remote control device for gate valves.

Features: Valve operator opens or closes gate valves in fraction of a second, time being limited by choice of actuating control.

Description: Operator converts linear motion into a rotary motion with high torque. The linear movement of a guided plunger along spirally-fluted shaft in a pneumatically-operated cylinder effects 180° shaft rotation. Standard



Valve operator develops high torque to open or close gate valves

models accomplish a 180° turn, but units can be constructed with range of several complete turns. Standard models operate at nominal air pressures available in most plants. If necessary they can be operated at pressures down to 50 psi.

Valve operator permits manual operation in case of power failure where systems are based on electrically operated solenoid valves. Manual control is also possible in case of air pressure failure.

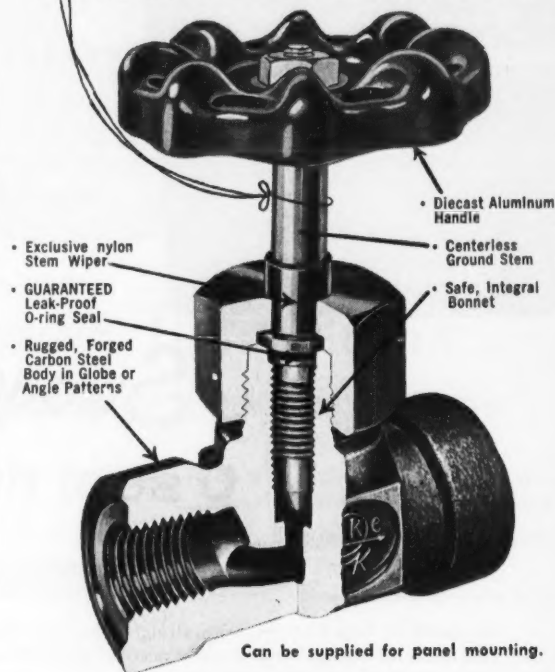
(Remote control operators are product of Vacuum Research Company, 420 Market St., San Francisco 11, Calif.)

Check 1708 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

THE INSIDE STORY*

* ON HOKE'S VERSATILE, NEW GENERAL PURPOSE VALVE



SERIES 100 FORGED NEEDLE VALVES

Use these versatile, full-flow Series 100 valves for throttling, regulating, or shut-off. Use them for applications where temperatures range as low as -40° or as high as 200° F. They're compact in size and available in a selection of male and female connections. *Guaranteed* against stem leakage!

Write for complete information and FREE sample valve on your company letterhead.



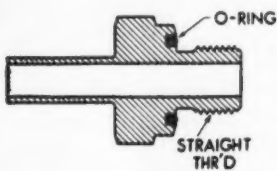
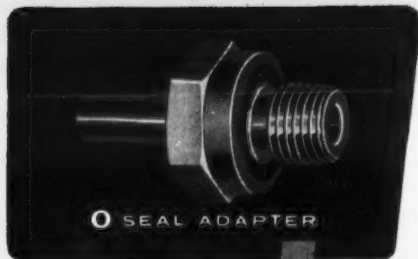
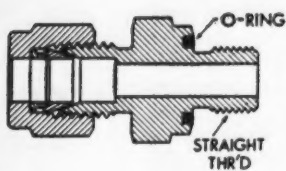
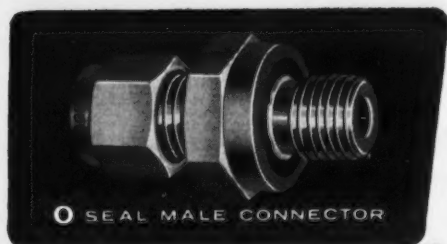
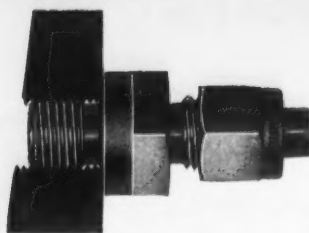
**HOKE
INCORPORATED**
Fluid Control Specialists

45 PIERMONT ROAD, CRESSKILL, N. J.

Check 1709 opposite last page

Eliminate even
minute leakage

in critical applications with



Swagelok®
O seal fittings

Swagelok O Seal Fittings, with straight machine threads, eliminate every possibility of leakage that usually accompanies the use of ordinary taper pipe threads.

Swagelok O Seal Fittings are completely assembled, ready for immediate use. The O ring seal is held in the body of the fitting and a variety of O ring materials for specific applications is available.

Installation of Swagelok O Seal Fittings is simple. Just drill and tap — no counterboring or port contour cutting necessary. The use of messy pipe dopes or sealants of any kind is completely eliminated.

Screw in Swagelok O Seal Fitting, tighten and the installation is complete. A pressure or vacuum seal can be obtained against any flat surface.

A wide variety of connections is possible thru the use of Swagelok O Seal Adapter.

Swagelok O Seal Fittings are available in all machinable metals and plastics in tube O. D. sizes from 1/16" thru 1".

For name of your local Swagelok Distributor, write Dept. C5

CRAWFORD FITTING COMPANY 884 East 140th Street, Cleveland 10, Ohio

Check 1710 opposite last page

PROCESS INSTRUMENTATION AND LABORATORY APPARATUS



Slow, tedious hand weighing was being used for batching plasticizers. To increase manufacturing efficiency, Apex Tire & Rubber Company turned to liquid batching . . .

Meters eliminate hand-weighing of plasticizers, improve quality control

Problem: In mixing components for each batch at Apex Tire & Rubber Company of Pawtucket, R. I., liquid plasticizers were painstakingly weighed out from 55-gal drums into 5-gal cans, then added to the dry components. The slow tedious procedure was sometimes inaccurate, and handicapped production.

Apex Tire & Rubber Company manufactures plastic hose and other products. In the process one or more different plasticizers, up to a maximum of 14, are added to the dry mix used in manufacturing the plastic material required. A rapid sales rise and

increased demand for the company's products had run "head-on" into manufacturing inefficiencies.

Solution: Installing an automatic system based on volumetric measurements rather than weights, Apex Tire & Rubber meters all the plasticizers used in the process.

How It Works

Instead of being weighed and then added, plasticizers are pumped through positive displacement meters to the vats. Each of the two mixing vats has 14 meters, each actuating a valve.

Plant workman at Apex Tire placing dry components into mixing vat. Battery of meters (center) control flow of liquid plasticizers to mixing vat, eliminating handweighing and increasing quality control

The operator sets each meter, calibrated in pounds, for the amount of plasticizer to be added to each batch. He starts the operation and the plasticizers flow through the meters and into each vat until the preset amount has been added. Automatically, the meter then actuates a solenoid valve which shuts off flow of that particular plasticizer.

All plasticizers used in the process can be handled by the metering system. Some liquids are heated to obtain a desired rate of flow; some are corrosive.

Results: Use of the metering system has eliminated the inaccuracies of hand weighing, resulted in better control of each batch, and increased manufacturing efficiency — thus enabling Apex to speed up its operation greatly.

Meter maintenance has been at a minimum and operation has been continuously accurate. The plant engineering department of the company considers the installation to be very satisfactory.

(Niagara Electriccontact meters are product of Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.)

Check 1711 opposite last page.

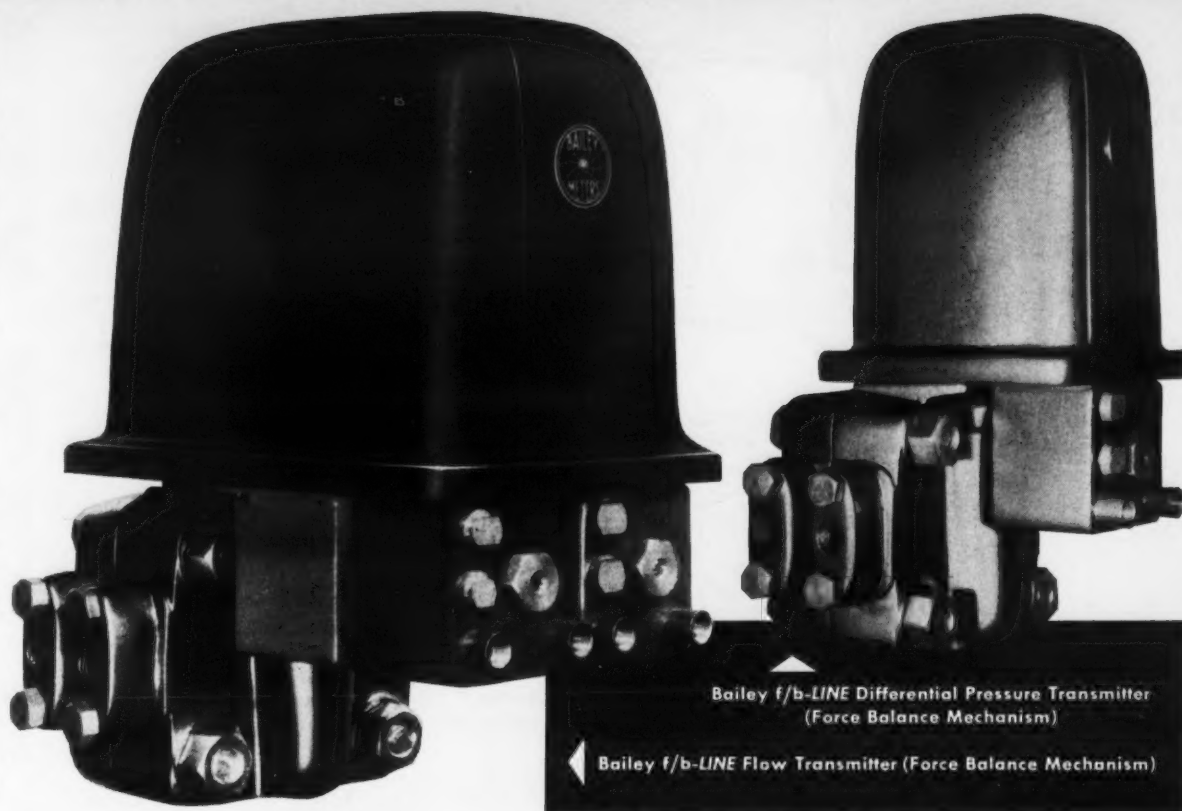
Bench-scale autoclave has agitator, and is compact

Capacity is 300 cc, rating to 5000 psi

Uses: As reaction vessel for broad range of laboratory-scale pressure reactions.

Features: Bench-scale stirred autoclave is compact, simple in design and lightweight.

Description: Autoclave is self-contained unit ready for



Two new Bailey *f/b-LINE* Transmitters permit new accuracy in measuring flow and differential pressure

Pneumatically transmits rate of flow—or differential pressure—measurements to indicating, recording, and/or controlling equipment at remote stations. Transmitters consist of a diaphragm measuring mechanism and a force balance pneumatic transmitting unit.

APPLICATION

For steam, water, air, gases and other fluids producing differentials across primary elements from 0-2 in. H₂O to 0-2000 in. H₂O at maximum service pressure of 50, 1500, and 5000 psig.

FEATURES

Transmits a Signal Directly Proportional to Rate of Flow. Uses receiver with uniformly-graduated chart or scale. Eliminates need for external square-root extractors or characterizers.

10 to 1 Turndown. Differential range of each diaphragm measuring element may be changed by factor of 10 to 1; e.g., 0-20 in. H₂O diaphragm may also measure 0-2 in. H₂O.

Screwdriver Adjustments. Range and zero adjustments readily accessible. Range may be changed with screwdriver adjustment.

Overpressure Protection. Protects against full service pressure applied to either side of diaphragm.

Fast Response. No viscous dampers needed, so speed of response is very fast.

Corrosion Resistant. For maximum differentials between 20 and 2000" H₂O, all parts in contact with process fluid may be stainless steel. No sealing fluids or sealing diaphragm required.

Good Stability. Reset type boosters give good stability with high gain.

Versatile Mounting. May be mounted on process piping, wall, or separate mounting pipe using same bracket.

For additional information, call your local Bailey District Office, or write direct.

Chemical and petroleum division

BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

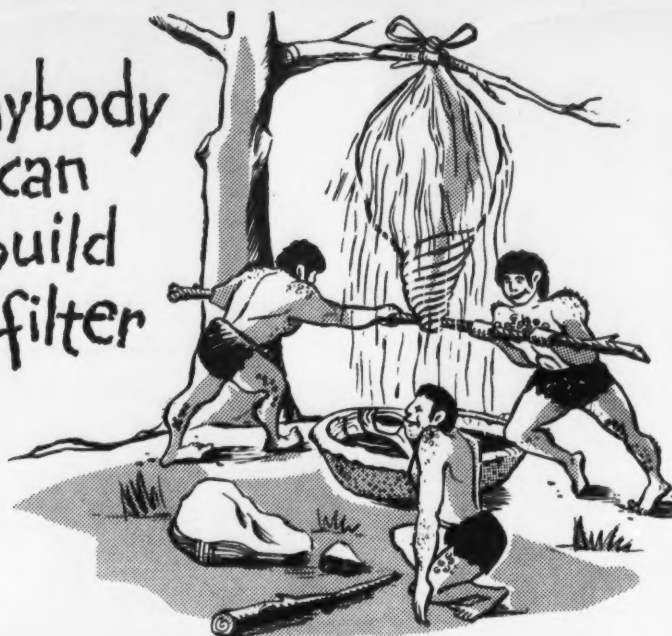
In Canada—Bailey Meter Company Limited, Montreal



CP4-1

Check 1712 opposite last page

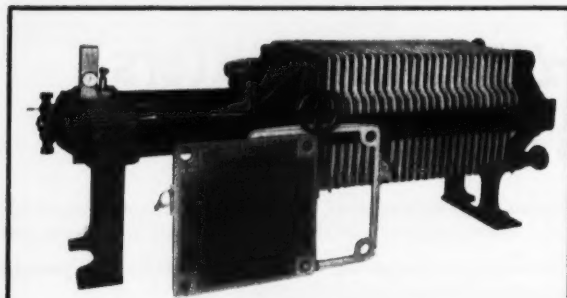
Anybody
can
build
a filter



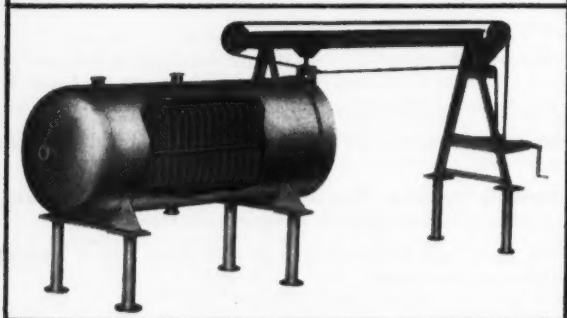
From earliest antiquity man has contrived to solve his problems in solids-liquid separation in a thousand different ways, some quite ingenious.

Today's filtration problems are more challenging than ever, calling for more critical appraisals and precise answers.

At Shriver's we are dedicated to investigating your problems and recommending and building the kind of filter that will best meet your specific purpose. And we do build many types! May we be of service?



Shriver filter press with plates of molded wood or glass fiber reinforced polyester and frames of polyvinyl chloride coated aluminum; a new combination of strong, lightweight materials of construction for resistance to many acid and alkaline process materials.



Shriver horizontal tank, vertical leaf pressure filter, with many improved features, recommended primarily for products in which liquid and solids are not miscible with water, or for other cases where the solids must be removed as a semi-dry cake.

T. SHRIVER & COMPANY, INC.

846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Decatur, Ga.—Houston, Tex.—Livonia, Mich.—St. Louis, Mo.
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FILTER PRESSES • VERTICAL LEAF FILTERS • FILTER MEDIA
HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 1713 opposite last page

INSTRUMENTS & LAB

connection to existing utilities. Equipment includes agitator, cooling coils, electric heating, sampling tube, charging opening, gas openings and either air or electric drive.

Vessel and stand occupy space of 7" x 13" x 20". Body of vessel and wetted parts are 316 stainless steel. Capacity is 300 cc and pressure range is 0-5000 psi at 650°F.

(Laboratory autoclave is product of Autoclave Engineers, Inc., 2930 W. 22nd St., Erie, Pa.)

Check 1714 opposite last page.

In-plant chromatograph automatically samples process stream

Uses air as carrier gas, catalytic cell

Uses: As chromatographic process stream analyzer.

Features: Instrument automatically samples process gas streams; uses catalytic combustion cell.

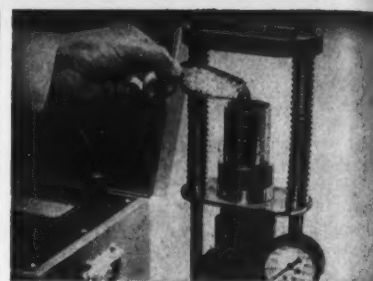
Description: Instrument uses chromatographic principle to separate individual components in gas stream. Catalytic combustion cells determine relative concentration.

Catalytic combustion cell is said to produce a larger signal output than conventional detection methods, making possible an extremely sensitive instrument with simple circuitry and controls. Air is utilized as carrier gas. Use of the cell is also said to extend the scope of chromatograph, particularly in trace detection of combustible gases and vapors, and for analysis of stream from partial combustion processes.

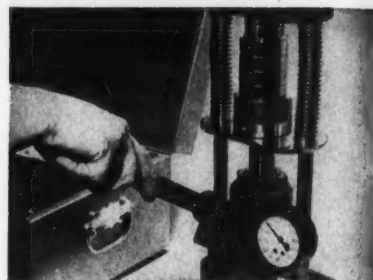
Recorder will indicate one to four components of gas stream separately, in such a manner that percentages can be read directly from recorder scale. Components for complete sampling system can be provided if desired.

(Chromo-Cat is product of the Davis Instruments Division, Davis Emergency Equipment Co., Inc., 47 Halleck St., Newark 4, N.J.)

Check 1715 opposite last page.



FEED IT...



SQUEEZE IT...



READ IT...

G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 1716 on reader service slip.

ELECTRONIC
MOISTURE REGISTER
Instruments

Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 1716 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

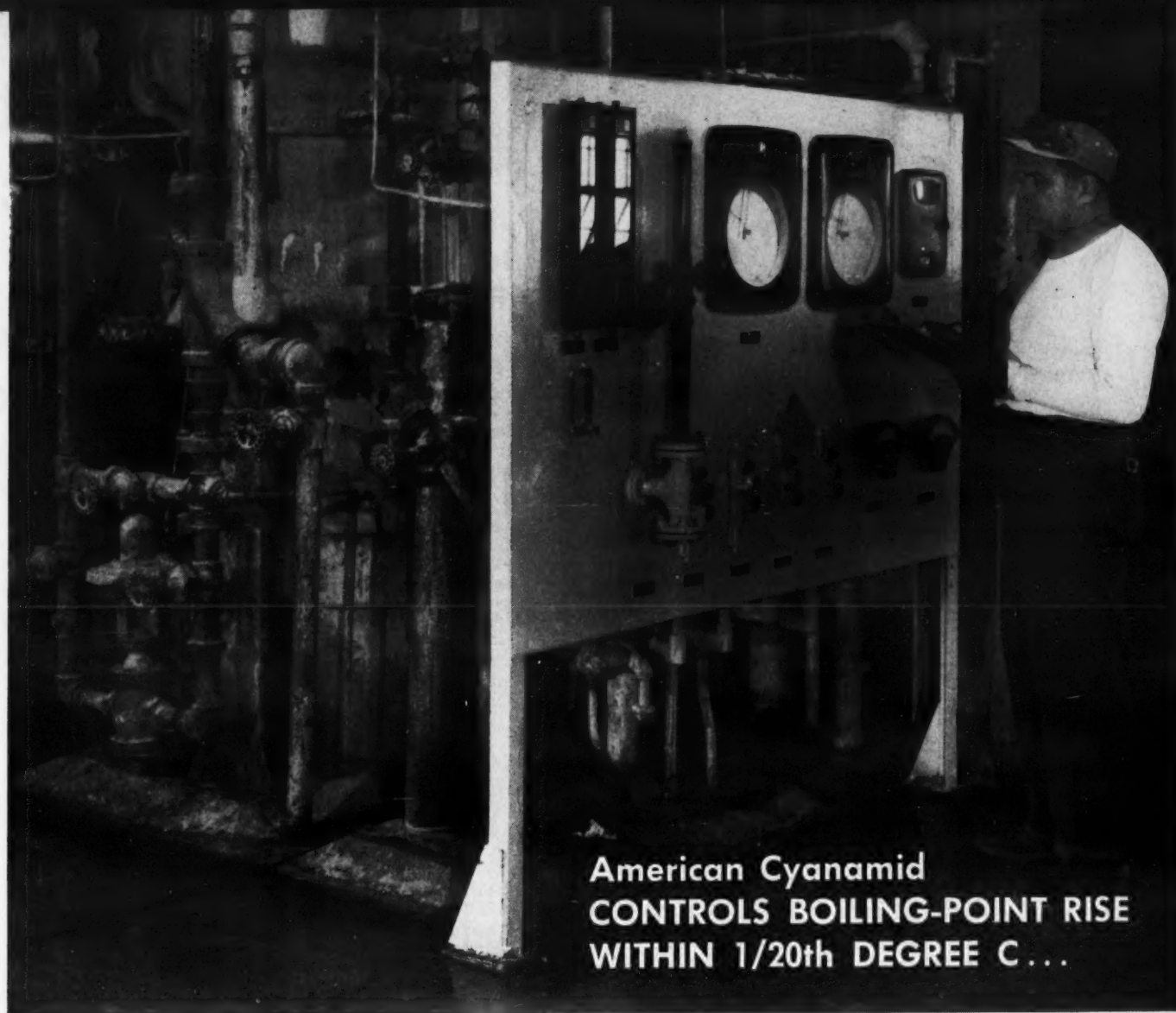
Cow coating

Keeping a cow cool in Colorado can be a complicated chore, according to rancher Harry H. Le Veen. Some varieties of livestock are difficult to raise in warm climates. Le Veen solved the difficulty by inventing a reflective, heat-insulating coating for his animals. The coating may be formed of an organic binder combined with a pigment. (D&O News, Dodge & Olcott, Inc.)

Barking dogs?

Now you can cool off those "hot dogs" and give your achin' feet a break with leather that "breathes". Hercosol® impregnated leather soles provide comfortable footwear and last 50% longer than conventional sole leather. It has greater flexibility, and is more shrink- and as wear-resistant. (The Hercules Mixer, Hercules Powder Company)

For more information on product at right, specify 1717 see information request blank opposite last page.



American Cyanamid
CONTROLS BOILING-POINT RISE
WITHIN 1/20th DEGREE C...

by unique narrow-span DYNALOG* Electronic Controller

Temperature difference control within 1/2 of 0.1°C — that's what American Cyanamid demands for process evaporators at their Organic Chemicals Plant in Bound Brook, New Jersey. Boiling-point rise must be held at 108.5°C, since even slight variations affect product quality.

A Foxboro Dynalog Recorder-Controller, with full-scale span of only 5°C, provides the close control American Cyanamid requires. Control is held continuously within 1/20th of a degree of set point — with chart records for proof.

Cyanamid's Narrow Span Controller was installed in 1955. It's been running continuously ever since,

virtually unattended. The only servicing or maintenance required on the Dynalog has been re-inking and chart changing.

Get the complete story on the exclusive Dynalog Controller, with full-scale spans as narrow as 5°F — the narrowest span available to industry today! Write for Bulletin 20-10. The Foxboro Company, 8110 Norfolk St., Foxboro, Mass. *Reg. U. S. Pat. Off.

FOXBORO
REG. U. S. PAT. OFF.

DYNALOG ELECTRONIC INSTRUMENTS

"NETONE" Filter Paper

- HIGH TENSILE STRENGTH
- HIGH BURST FACTOR
- ABRASION RESISTANT
- CREASE RESISTANT
- CHEMICAL RESISTANT

"NETONE" Filter Paper is a neoprene impregnated kraft paper that offers decided mechanical and chemical advantages over standard filter papers.

When compared to 60-pound unbleached kraft "NETONE" Filter Paper shows a 500% increase in wet tensile strength, wet burst factor increases from 6 to 57 and there is a marked increase in abrasion and crease resistance.

The following are a few test results indicating comparative resistance factors.

Solution	60-Pound Kraft	Wet Strength Resin	Neoprene Treated (3%)
H ₂ O	0	72 hr.	86 hr.
10% HCL	0	6 min.	4 hr.
10% NaOH	0	6 hr.	72 hr.

Write us about your requirements and we will be glad to send samples for your testing.

.. And for your filter cloth requirements we weave fabrics of treated Cotton, VINCEL†, SARAN, DYNEL, GLASS, DACRON††, TEFLON***, POLYETHYLENE, NYLON, ORLON*, AND POLYMAX†. Samples sent on request.

* TM for duPont Acrylic Fiber
*** TM for duPont Tetrafluorethylene Fiber

† TM-NFM Reg. U. S. Pat. Off.
†† TM for duPont Polyester Fiber



Weavers of Industrial Filter Media for over Fifty Years

NATIONAL FILTER MEDIA Corporation

General Offices and Mills: New Haven 14, Conn.
Western Office and Factory: Salt Lake City 10, Utah

Hudson, Ohio: 227 Hartford Drive
Los Angeles, Calif.: 416 West 8th St.
Chicago, Ill.: 6034 N. Cicero Ave.
Elizabethton, Tenn.: Paul Chapman Assoc., Box 787
Toronto: Lee Benner Chem., C. P. R. Roadway, 1119 Yonge Street

Mexico City: Maquinaria Minera, Apartado Postal #215
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Ave.
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive
Montreal: Lee Benner Chem., 4700 Prince of Wales

Check 1718 opposite last page

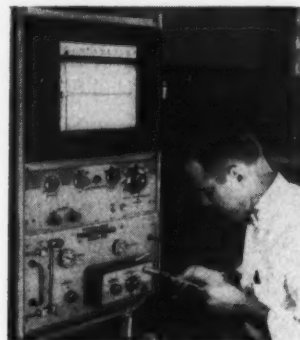
INSTRUMENTS & LAB

Gas analyzer developed for high-temperature applications

Chromatographic unit has increased sensitivity

Uses: For fast, accurate analysis of a wide variety of mixtures with a boiling point of 0 to 425°C. Besides petroleum and petrochemical products, unit is useful in analytical control of LPG, beverages, perfumes, detection of trace impurities in commercial solvents.

Features: Chromatographic analyzer has increased sensi-



Gas analyzer handles samples with boiling temperatures to 425°C

tivity, nearly 12 times more than former model.

Description: Instrument has column working temperature to 300°C. Flash evaporator, built into sample injection unit, enables operator to inject high-reproducibility samples of melted solids or liquids with boiling temp to 425°C.

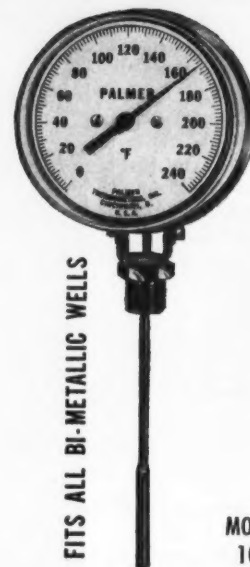
Integral strip chart recorder has range of 2 millivolts, full scale, in place of 5 mv of older models. Recorder sensitivity is controlled by a 17-step selector dial with two ranges. Sensitivity can be varied from two to 400 mv, full scale.

Instrument has integrator to count "pips" under each peak. Transistors replace vacuum tubes of former model to permit greater stability and accuracy.

(Model 300 Fisher-Gulf partitioner is product of Fisher Scientific Company, 711 Forbes St., Pittsburgh 19, Pa.)

Check 1719 opposite last page.

Outstanding Accuracy PALMER Dial Thermometer



MODEL
1035

Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory,
Recording and Dial Thermometers
2515 Norwood Ave., Cincinnati 12, O.

Check 1720 opposite last page

CHEMICAL PROCESSING

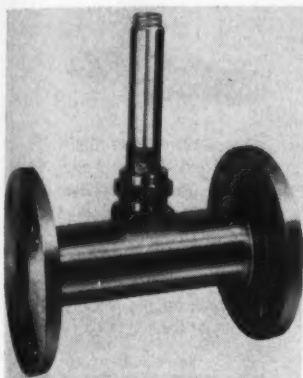
Detects difficult flows in either direction

Flow transducer has no moving parts

Uses: Detecting flow of difficult liquids.

Features: Flow transducer detects flow in either direction; is constructed of stainless; has no moving parts.

Description: Flow transducer uses strain gage to de-



Stainless steel flow transducer is strain-gage operated

tect flow. Instrument is phase sensitive, thus detects direction and indicates accordingly. Electrical output can be applied to many commercial indicators, recorders, or controllers. Unit is easily adaptable to telemetering applications.

Instrument is large model of previously-developed instrument, and uses same basic sensing element as in smaller models. This version features housing with welded steel flanges in all nominal pipe sizes. Range limitation is 10-1 on any single transducer. Accuracy is 1/2 percent.

(Mark V Flow Transducer is product of Ramapo Instrument Co., Inc., 8 First St., Bloomington, N. J.)

Check 1721 opposite last page.

Receiver recorder components including 12 types of receivers, controllers, retransmitters, and direct measuring devices are detailed in 16-page Product Spec E12-5.—Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.

Check 1722 opposite last page.



NOTHING BUT THE BEST IN GAGES FOR WORKING PRESSURES FROM 30" VACUUM TO 10,000 p. s. i.

These details of Helicoid gage design assure longer life and enduring accuracy

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The sustained accuracy of Helicoid Gages over millions of cycles is explained by the details of design and construction of the Helicoid movement shown at the right.

Rolling action of the cam facing against the roller surface... graphited Bakelite bushings, roller pivot base and cam facing... K Monel connecting links and screws... all such Helicoid features protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation through millions of cycles.



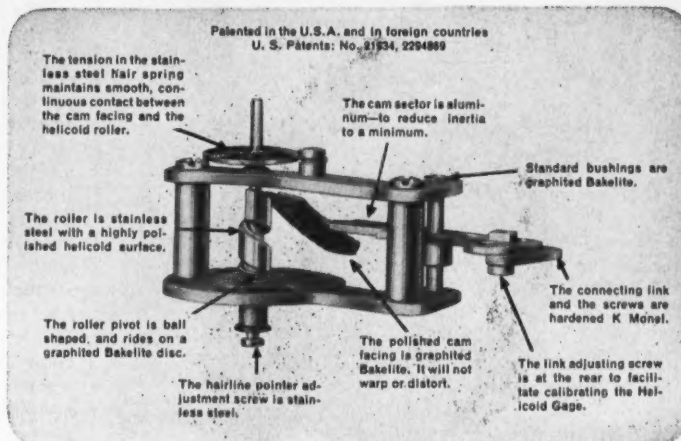
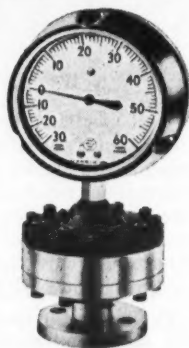
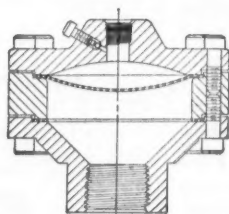
EASIEST ADJUSTMENT AND CALIBRATION

Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

THE CHEMICAL GAGE

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm. The indicating system above the diaphragm is filled completely with specific inert liquids.



TUBES BUILT FOR MILLIONS OF PRESSURE PULSATIONS

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.



For complete information on the Helicoid line of gages write for Catalog G-52

**Helicoid Gage Division
AMERICAN CHAIN & CABLE**

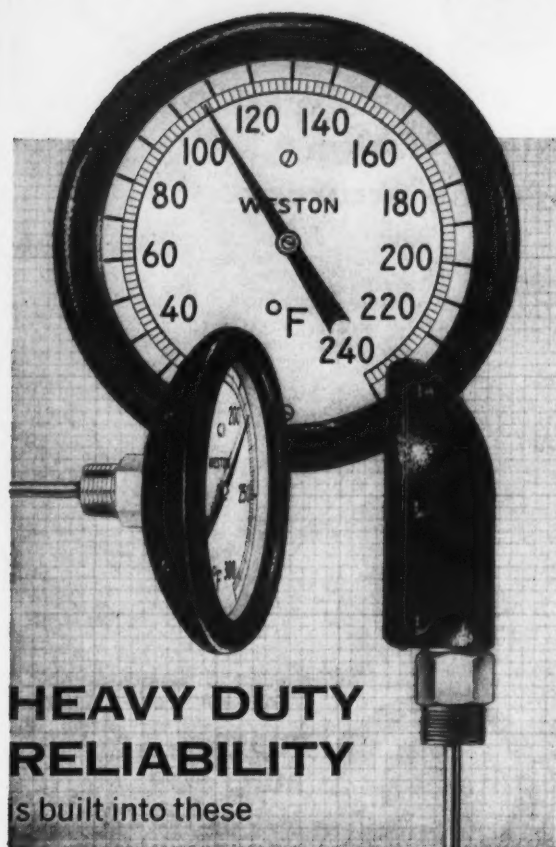
929-F Connecticut Avenue • Bridgeport 2, Connecticut



Helicoid gives you all these features at prices that are competitive in the quality gage field

Check 1723 opposite last page

WESTON THERMOMETERS: STANDARDS OF STABILITY IN SCIENCE AND INDUSTRY



**HEAVY DUTY
RELIABILITY**
is built into these

WESTON BIMETALS

For lasting accuracy, even under punishing conditions, you can depend on Weston heavy duty bimetal thermometers. Exceptionally stable sensitive elements . . . corrosion-proof, pressure-tested stainless steel stems and connection nuts . . . rugged forged brass heads . . . suit these bimetals for the most strenuous service. Accuracy is assured within 1% of full scale range. 20 standard ranges: running from -100° to 1000°F or -100° to 400°C. Standard stem lengths from 2½" to 72".

Model 2221: has a 5" diameter head with 9" scale.

Model 2231: 6" diameter head with 12" scale.

Model 1221: straight form—basically the same as Model 2221, but with scale parallel to stem. Stem can be located in any one of 24 positions around the periphery of the head.

For full information, call your local Weston representative, or write to Weston Instruments, Division of Daystrom, Inc., Newark 12, N. J. In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 10, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.

WESTON
 *Instruments*

Check 1724 opposite last page

INSTRUMENTS & LAB

Sample applicator saves time

Chromatography unit is automatic, flexible

Uses: As automatic applicator in paper chromatography.

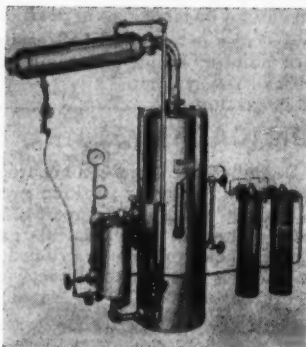
Features: Instrument is automatic in action, yet flexible.

Description: With a chrome-plated rack that holds a maximum of seven pipets, rocker arm control is set so that pipet tip touches paper six, twelve, or 18 times per minute. Warm air flows from blower continuously to dry sample between successive applications. Air flow is regulated by individual air valves. Air temperature is controlled by power supply. Distance between successive application points is one inch. Maximum width of paper accommodated is nine inches.

Applicator operates on 115 volts 60 cycles.

(Chromatograph applicator 60498 is available from Scientific Products Div., American Hospital Supply Corporation, 1210 Leon Place, Evanston, Illinois.)

Check 1725 opposite last page.



Water demineralizer

. . . used with steam-heated water still produces distilled water of higher purity and eliminates need of clean still. Demineralizer removes impurities before distillation. One set of cartridges processes several thousand gallons.

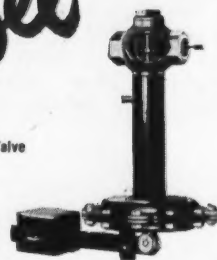
(Feedback purifier is product of Barnstead Still & Demineralizer Co., Boston 31, Massachusetts)

Check 1726 opposite last page.

If you need to reduce
fluid pressure safely, economically . . .
call for a valve from

Klipfel

No. 410 Reducing Valve



Klipfel makes Reducing Valves for every purpose—60 different types of them, in fact. They operate on air, gas, steam, water or other liquid, with initial pressures up to 300 psi and reduced pressures as low as vacuum. You can choose from five different inner valves, three different actuating means and four loading means.

Also available from Klipfel are Float Valves, Relief Valves and Temperature Regulator Valves—and special valves made of corrosion-resistant materials. For information on any valve, call your supply house or write for Catalog 54.

Call your supply house, or write for Catalog 54.



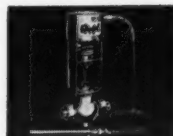
No. 410 Reducing Valve



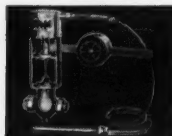
No. 300 Reducing Valve



No. 135 Relief Valve



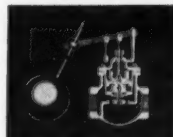
No. K-449 Temperature Regulator Valve



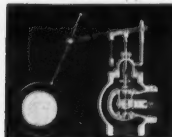
No. K-348 Temperature Regulator Valve



No. 135 Multiport Relief Valve



No. 7 Float Valve



No. 27 Float Valve



No. 135 Multiport Relief Valve

HAMILTON • OHIO

Klipfel

 VALVES INC.

Automatic Temperature-and-Pressure-Regulating Valves Since 1902

Float Valves • Temperature Regulators • Back Pressure Valves • Reducing Valves



A DIVISION OF THE HAMILTON-THOMAS CORPORATION

Check 1727 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

Mosquito foil

Lightweight, strong glass-fiber screening is coated with Geon polyvinyl material. It doesn't get wrinkled or dented from accidental bumps. Polyvinyl finish is glareless, and won't spoil the view.
(GoodChemCo News, B.F. Goodrich Chemical Co.)

Have lab will jab

A complete medical laboratory for preparing calf-lymph dried smallpox vaccine was assembled in Chicago for shipment to Dacca, capital of East Pakistan. According to assemblers, Arthur S. LaPine and Co., lab is first such installation in that part of world.

It will be set up to produce vaccine and inoculated fifty million inhabitants of nation not immunized in the first phase of mass inoculation program.

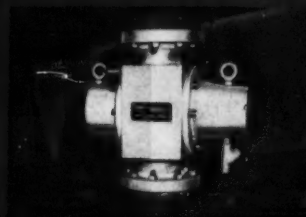
For more information on product at right, specify 1728 see information request blank opposite last page.



AccuRay offers continuous flow density systems

Accurately measuring liquid density, specific gravity, percent solids or related quantity, the AccuRay Density System applies nuclear radiation measurement to process control. Without contacting the process material, measurement is made continuously, independent of flow rate, pressure or viscosity. The AccuRay System is stable and rugged—designed to withstand shock and vibration under the most adverse industrial conditions.

Use AccuRay to increase profits through the close control of evaporator feed and effluent; extraction solvent-feed ratios; reactor catalyst-feed ratios; distillation salt feed and product qualities; proportioning of reactants and products; and feed and product quality measurements in the many separation processes of filtration, centrifuging, cycloning, flotation, and clarification.



AccuRay measuring head is easily installed in pipe system—flange connection.



The AccuRay Density instrument which will indicate within a few seconds when the liquid density has changed.

**Industrial
Nucleonics**
CORPORATION

1157 Chesapeake Ave. Columbus 12, Ohio

Please send complete details on AccuRay
Continuous Flow Density Systems

Name _____ Title _____

Company _____

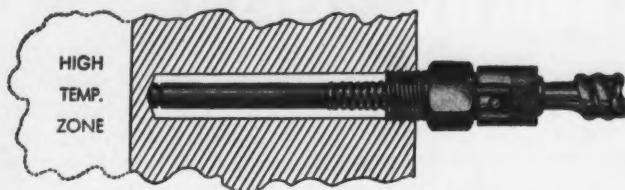
Street _____

City _____ Zone _____ State _____

Application _____

Spring-Loaded Thermocouples Assure Dependable Contact

Field-Proven By Many Years' Successful Use



You always get fast, dependable response from T-E's miniature bayonet thermocouples because (1) spring-loaded hot junctions are always held in tight contact with the measured surface—regardless of expansion and contraction, and (2) the 'couples themselves are extremely sensitive to temperature changes. They are widely used with cylinder heads, extruders, heat transfer lines and other similar applications. Adapters of different lengths permit use of one thermocouple to measure temperatures at many different depths. Specially designed, patented, pipe-clamp adapters are also available. Bayonet-lock caps provide quick, easy removal. Lead connections are supplied straight or with 45° or 90° angles. All probes and adapters are of Stainless Steel. Available in C-C, I-C and C-A.

Write for Bulletin 2-R.

Thermo Electric Co., Inc.

SADDLE BROOK, NEW JERSEY
In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

Check 1729 opposite last page

BISONITE'S #957 COATING SYSTEM

for Superior Corrosion Control

COATINGS

CORROSION REPORT
Material

Acid
Alkali
Solvents

BISONITE "957"
Resistance

Excellent Good Poor

To prevent Corrosion by and Contamination of
Food Products Heavy Chemicals Beverages
Oils and Greases Hot Water
Salts Solvents

A thermally cured coating that resists acids, solvents and alkalis

- Permanent adhesion.
- Withstands 72% caustic at 130°C. for prolonged periods.
- Strong • Tough • Flexible.
- Glazed glasslike surface.
- Greater thickness in fewer coats. Reduces cost.
- A NEW Advance in the field of applied coatings.
- Applied by qualified applicators across the nation.



Solves many problems of chemical corrosion. For lining tanks, tank cars, pipes, food containers, storage bins, fans, ducts, hoods, etc. at moderate cost. Made by a company specializing in corrosion resistant coatings. Not a side line. BISONITE products in many cases have corrected conditions when other coatings have failed. Write for descriptive literature. Our nearest approved applicator will be glad to give your coating problems immediate attention.

BISONITE COMPANY, Inc.

2246 Military Road
Buffalo 17, N.Y.

Check 1730 opposite last page

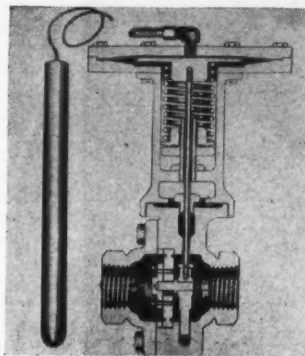
INSTRUMENTS & LAB

Plastic-coated bulb
resists corrosion

Bulb and valve assembly
useful to 185°F

Uses: As temperature control valve and bulb assembly in corrosive applications.

Features: Entire thermal bulb and capillary tubing of assembly is heavily coated with protective heat-conducting plastic film resistant to variety of chemicals.



Sensing bulb of assembly is plastic coated to resist corrosion

Description: Thermal bulb is suspended freely or clamped in controlled equipment. Capillary tubing is available in 8 foot, 15 foot, or special lengths. Plastic will withstand immersion in temperatures up to 185°F. Plastic used is good conductor of heat, although not quite as sensitive as all-metal systems. Quick reaction to temperature changes affords close control.

Sliding gate temperature control valves in assembly are available in sizes 1/4" to 2".

(TVC thermal system is product of Jordan Industrial Sales Division, OPW Corporation, 6013 Wiehe Road, Cincinnati 13, Ohio.)

Check 1731 opposite last page.

Annunciators

Folder of four pages describes recently-designed annunciator using static-magnetic control. Bulletin 101 — Panellit, Inc., 7401 N. Hamlin Ave., Skokie, Illinois.

Check 1732 opposite last page.

Fast-accurate

SULFUR analysis

IRON STEEL PETROLEUM PRODUCTS
ORGANIC CHEMICALS STAINLESS ALLOYS COAL
WOOD NON-FERROUS METALS COKE
MINERALS

with a

DIETERT-DETROIT Sulfur Determinator



The Dietert-Detroit Sulfur Determinator features an extremely simple direct-reading burette. No involved measuring or computing. Provides fast accurate analysis of sulfur content in scores of materials. Low cost, durable, easily maintained. Widely used in company laboratories and institutions of every description for over 18 years.

Dietert-Detroit Sulfur Determinator No. 3104, with combustion furnace.

Send for FREE Catalog!

16 page Dietert-Detroit Catalog illustrates and describes both Sulfur and Carbon Determinators and complete line of accessory equipment and supplies.

HARRY W. DIETERT CO.
CONTROL EQUIPMENT

9330 ROSELAWN DETROIT 4, MICHIGAN

Send me your latest Carbon-Sulfur Determinator catalog.

NAME _____

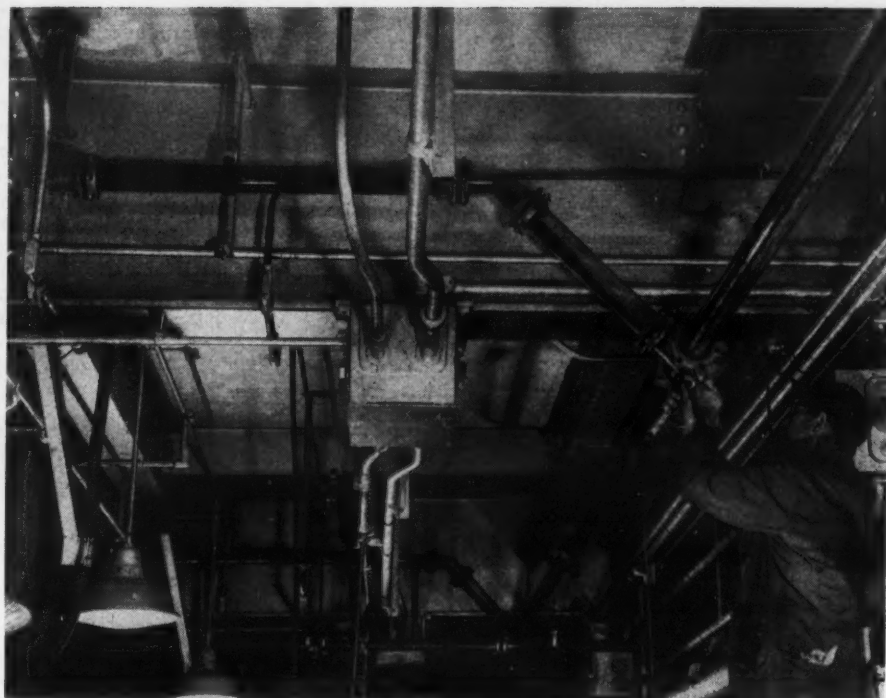
COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Check 1733 opposite last page

CHEMICAL PROCESSING



Mechanic adjusts flanges on glass pipe used as drain-line from acetylation vats on floor above

Visibility, ease of cleaning advantages of glass piping

**Easily installed, corrosion-resistant pipe
solves problem of plug-ups in cellulose
acetate drain lines at Celanese plant**

Problem: Piping used for cellulose acetate drain lines in use at Celanese Corporation of America, Rock Hill, S.C., could not be easily dismantled when plug-ups occurred.

At the plant, four rows of reactors used in the manufacture of cellulose acetate drain into a series of gutters on main floor, which lead to the chemical waste sewers. Waste consists of sulfuric acid, acetic acid, and a cellulose acetate effluent. In the event of acetate "dope" overflowing into the lines, water precipitates the fluid "dope" into a solid acetate flake that plugs the drainlines.

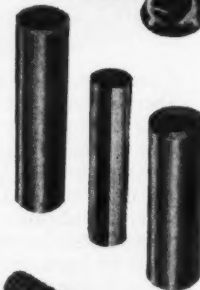
One type of piping used for drainlines, which employs a bell-and-spigot joint, was satisfactory from a corrosion standpoint, but was almost impossible to clean without breakage. Steam cleaning could not be used for this piping because of thermal shock.

Plant tried flanged alloy piping for drains. Sulfuric acid spillage caused corrosion failures with it. Plant engineers were looking for a type of piping that could withstand the corrosives encountered and yet be easily cleaned when plug-ups occurred.

Solution: In October 1957 plant installed

Reduce Equipment Downtime And Replacement Costs

... with
CLEVELAND
Custom
Produced
Welded
Hard-Faced
Components



- Resistant to Wear, Corrosion and High Temperature
- In All Stainless Steel And Ferrous Alloys

■ Welded super alloy overlays applied only to critical areas subject to corrosion, erosion, abrasion, heat, thermal shock or impact, provide superior surface properties and precision finishes.

Whatever the size or shape, the metal overlay can be fused to all stainless and ferrous alloy O.E.M. and worn equipment at low cost.

For practical, prompt assistance on your application, send in your blueprint or call on our trained specialists.

Write for detailed literature



Cleveland Hard Facing, Inc.
3047 STILLSON AVE. • CLEVELAND 5, OHIO

Check 1734 opposite last page

CORROSION CONTROL

3"-diameter, corrosion-resistant Pyrex brand glass piping for the drainlines. It took 128 man hours to fabricate and install the following: 220' of glass piping, 65 flanged joints, 32 field-cut and beaded joints, eight 3" tees, and 12 3" elbows. Seven floor drains of glass pipe were connected into line. Glass was inserted into existing floor fittings.

Results: Celanese has found that removal of the precipitated dope is much easier and quicker. Because the glass is so smooth, the sections can be



Visibility and ease of cleaning permitted plant to go to a smaller diameter pipe with glass (right). Metal pipe (left) handles same amount of waste, is larger to minimize effect of buildup

taken down and the dope actually pulled out right at the site — rather than removing the pipe, as previously, and steam-cleaning it.

In many cases it is not even necessary to dismantle line for cleaning. By inserting a water hose in the opened end of the line and pushing the hose through the pipe, the dope and precipitated flake can be flushed out of the line without removal of pipe.

Visibility factor is an important advantage of glass pipe since it permits men to determine where scale or dope buildup has occurred. This factor, plus ease of cleaning, permitted plant to go to smaller diameter pipe with glass than had been used previously.

Glass pipe is easily installed. According to Donald McGinnis, Celanese project engineer, "Once the length of a section of pipe is determined (where cutting is required) the pipe can be marked, cut, beaded and flanges slipped into place

ANY ALLOY

**ANY
SIZE**

WHATEVER YOUR PIPING

NEEDS, ESCO SPUNCAST® FILLS THE ORDER

Corrosion, heat, abrasion or vibration, you can reduce them all with *ESCO* Spuncast pipe. Centrifugally cast in a wide variety of *ESCO* alloy steels, heat treated and tested, *ESCO* Spuncast pipe will cut replacement costs in chemical, pulp and paper and petro-chemical plants, or in any other type of installation subject to severe conditions.

Available in special alloys, in sizes to 36" OD and wall thickness from 1/4" up and in large or small quantities *ESCO* Spuncast Pipe is the greatest corrosion-resistant value your pipe dollars can buy.

Write for free booklet — "How to Cut Costs With *ESCO* Spuncast"



**ELECTRIC STEEL
FOUNDRY COMPANY**

2186 N. W. 25TH AVE. • PORTLAND 10, OREGON
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
ESCO INTERNATIONAL, NEW YORK, N. Y.
IN CANADA ESCO LIMITED

Check 1735 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

ready for bolting in six to eight minutes." Celanese plans to install another glass drain-line in the near future.

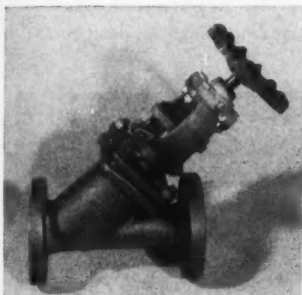
(Pyrex brand glass piping is product of Corning Glass Works, Corning, N.Y.)

Check 1736 opposite last page.

Extra lift removes disc from flow area danger in stainless valve

Uses: Unit is recommended for handling variety of corrosive chemicals, petroleum products, spirits, gases, and slurries.

Features: Extra lift removes disc from flow area and mini-



Renewable Teflon disc of stainless steel Y valve is removed from flow area by extra lift

mizes line entrapment and pressure drop.

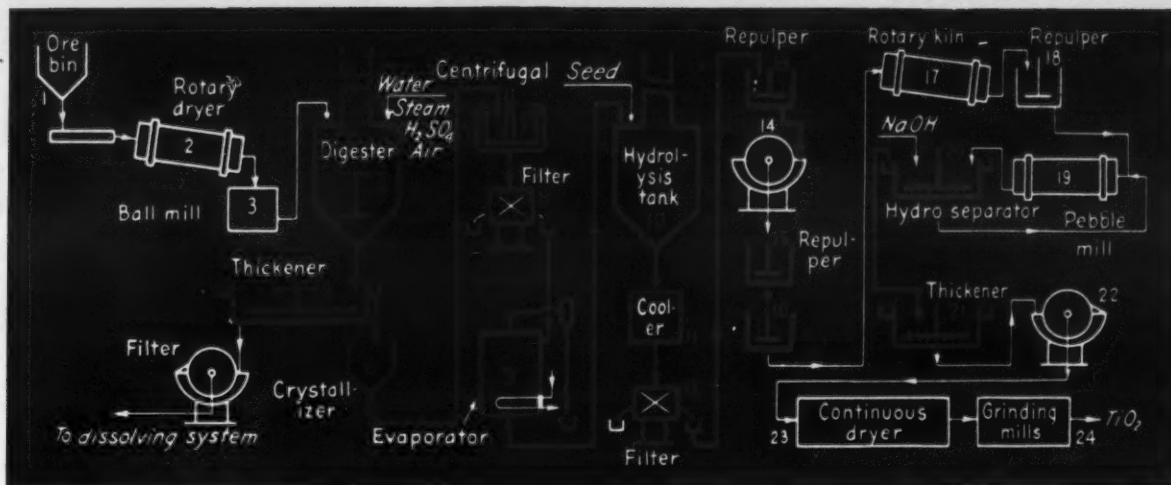
Description: Stainless steel Y valve is designed to ASA B 16.5 and MSS SP-42 specifications. Valve is produced in ½ to 3" screwed and socket weld and ½ to 8" flanged. Pressure range is from vacuum to 275 psi at temperatures to 750°F or limits of disc material.

Valve body is available in choice of stainless steel Types 304, 316, 347, FA-20, nickel, monel, and ELC versions.

(Stainless steel Y valve is product of Cooper Alloy Corp., Hillside, N. J.)

Check 1737 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



How lead is used to control corrosion in Titanium Dioxide Production Equipment



TiO₂ is not corrosive. But H₂SO₄ is a real metal-eater . . . first on the attacking line in the production of TiO₂.

First on the defensive line, however, is lead, dependability itself when it comes to combating many corrosive chemicals.

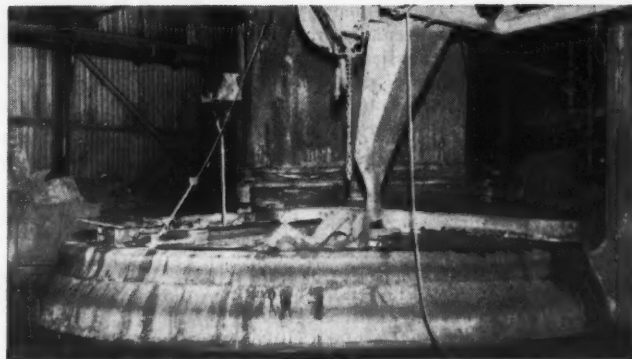
Lead reacts on contact with H₂SO₄ and other "corrosives" to form an insoluble, impermeable film. This film adheres to the metal surface . . . stopping or slowing down further reaction or attack.

Starting with digesters, where ilmenite ore is treated with sulphuric acid, lead is a steady defender . . . as lining for vessels and tanks, valves and pumps, in heating and cooling coils, in centrifugals and filters. It is used in combination with steel, concrete, wood or brick in many of the steps in the manufacture of TiO₂.

And bear this fact in mind: the use of lead cuts down-time. Lead lends itself to prompt, low-cost repairs. In case of leak or lesion, the affected area may be fixed quickly, with minimum loss of production. And . . .

...when you think of Lead...

think of National Lead



National Lead's long experience in bringing lead and steel together . . . in acid-handling lines, in complex, massive process, storage and shipping vessels . . . is at your service. When lead and steel are bonded together in this equipment, the union is stronger than lead's tensile strength. Cracking of the lining, due to vibration, pressure and rapid cyclic temperature changes, is held to a minimum. Creep is virtually eliminated.

Perhaps lead can save you money. Contact National Lead Company, Lead Lined Products, 111 Broadway, New York 6, N. Y., for information.

Check 1738 opposite last page


this NO-COST TEST OFFER
 has CONVINCED thousands
 ... send for YOUR FREE
 "TEST CAN" of C-5 "hi-temp"
 ANTI-SEIZE THREAD COMPOUND!

FEL-PRO
 C-5
 "HI-TEMP"
 THREAD COMPOUND

1614-CR
ANTI-SEIZE THREAD COMPOUND

For chemical plant uses, on all studs and bolts exposed to temperatures up to 1800°F. such as on compressor head assemblies, hot pump studs, autoclaves, reactor flange studs, heaters, heat exchangers, "cat" crackers, stainless steel assembly.

Try C-5 and see why leading refineries, manufacturers and power producers have made it part of their regular preventative maintenance program.

"HIGH-TEMP"
 ✓ Ends Seizing and Galling even up to 1800°F.
 ✓ Reduces Wrench Torque
 ✓ Ends Stud Breakage
 ✓ Permits Repeated Re-use
 ✓ Speeds Assembly and Disassembly
 ✓ Protects Stainless Steel at all Temperatures

C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when

dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.
WRITE TODAY... For Your FREE Test Sample Can of C-5.
FELT PRODUCTS MFG. CO.
 Dept. 54, P.O. Box 8609,
 Chicago 80, Ill.

Check 1739 opposite last page



Permanently End Condensation Drip, Rust and Corrosion with NoDrip Plastic Coating!

Here is the inexpensive, easy way to solve your condensation problem once and for all. NoDrip plastic coating acts immediately to insulate and protect tanks, pipes, walls, ceilings, air ducts and other metal equipment against condensation drip, rust and corrosion. NoDrip can be applied by anyone without special experience with brush, trowel or spray. NoDrip is also resistant to acid, alkali and brine... protects concrete, brick, plaster, tile, wood or composition surfaces.



32-PAGE
NoDrip DATA
HANDBOOK

Complete with photographs, charts and technical information to help solve your condensation problem. Write today!

Available at leading plumbing and mill supply houses
J. W. MORTELL COMPANY, 530 Burch St., Kankakee, Ill.

Check 1740 opposite last page

CORROSION CONTROL

Develop aluminum lining for tank applications

An aluminum lining has been developed for specific use with nitrogen-containing fertilizer solutions where a high content of ammonia builds up pressures that make conventional linings unsuitable.

Especially suitable for re-lining of tanks already in use, the lining is built up from three overlapping films of aluminum. These aluminum films are bonded with an adhesive not chemically attacked by the ammonia solutions. The same adhesive is used for adherence to metal, concrete, wood, or other basic construction material.

(Aluminum tank lining is development of Automotive Rubber Co., Inc., 12550 Beech Rd. at P.M.R.R., Detroit 39, Michigan.)

Check 1741 opposite last page.

Achieve close control of film thickness with hot spray

Painting system cuts 40% off application time

Problem: Obtaining best results with corrosion-resistant coatings depends on mil thicknesses being held to close tolerances. Western Knapp Construction Company, builders of chemical plants, mills, and other commercial buildings, wanted a painting system that would eliminate need for excessive applications and still maintain coating uniformity.

Meeting requirements for mil thickness usually meant multiple coat applications separated by hours or days before completion. Although hot-spray method could cut application time, conventional hot-spray heaters were not adaptable to mobility and long hose lines needed in full-scale plant work.

Solution: Western Knapp tested a mobile hot-spray painting system with heavy-duty pump and heater. Unit serves two guns simultaneously from original paint container and requires no pres-

Optimum Chemical, Beverage, Food Payload with Litewater Portersville Stainless Tanks



Engineered to eliminate every ounce of needless weight for optimum payload. Exclusive Portersville reinforcing rings at stress points assure you of extra mileage per tank. Portersville micro-smooth stainless steel tank interiors exceed sanitary requirements while cutting cleaning costs.

Send your tractor data and commodity requirements to our engineering department. We'll send you a Portersville Loading Diagram designed to fit your requirements.

Portersville Stainless Equipment Corp.

PORTERSVILLE (BUTLER COUNTY) 10, PA.

Check 1742 opposite last page


 Up to 1200° F.
 to absorb
 piping vibration

Use Only
UNIVERSAL
"UC3" STANDARD
All-Metal
Stainless Steel Flexible
CONNECTORS

- ✓ Conveys Corrosives
- ✓ For Higher Pressures
- ✓ Simplifies Misaligned Hookups
- ✓ Installation Time Saved
- ✓ Also Available in Bronze and Carbon Steel

Ask for Bulletin IPB Sec. 7C

QUALITY...
 All-Metal
 Flexible
 Hose Products


Universal
METAL HOSE CO.

2189 South Kedzie Avenue • Chicago 23, Illinois

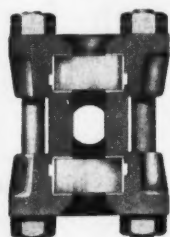
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CHEMICAL PROCESSING

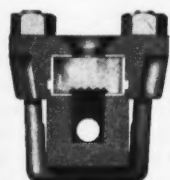
Strahman

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION



REFLEX

Single or Multiple
Sections

TUBULAR

Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

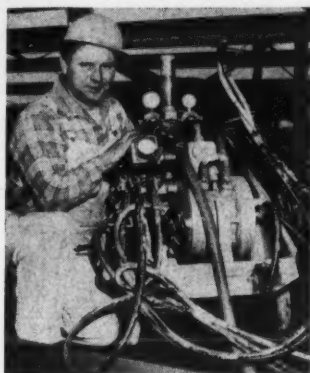
STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.



CORROSION CONTROL

sure tank. Heater has sufficient capacity to permit long operating hose lengths.

Results: With this hot-spray system, Western Knapp has found it possible to obtain four mils of vinyl coating in one application . . . about twice thickness possible with



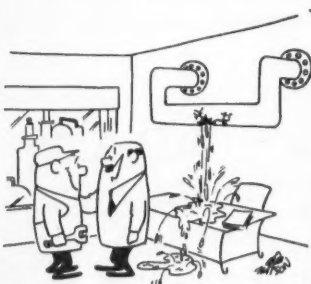
Hot-spray unit permits use of long hose lines

conventional spray. A time saving of almost 40% was accomplished.

Edges, bolt heads, and recesses get full coverage, overspray is reduced. Spray unit provides trouble-free service. A solvent flush once a week, or every two weeks is the only maintenance necessary.

(Chieftain hot-spray system is a product of Spee-Flo Company, 720 Polk St., Houston, Texas.)

Check 1745 opposite last page.



"I want to thank you, Griggs, for bringing this corrosion problem to my attention."

CHEMICAL PUMP

Can Run Dry

Continuous or Intermittent Service
Handled By ECO GEAR-CHEM* Pump.

If your process demands:

- Continuous or Cyclic Wet or Dry Operation
- Self-Priming Characteristics
- Full or Restricted Flows
- Linear & Reproducible Flows
- Metering Accuracy
- Reversible Operation
- Freedom from Contamination
- Temperature, Viscosity & Pressure Changes

*Specify the
ECO CARBON
GEAR-CHEM*
Pump.*



Viscosities to 5000 SSU • Temperatures to 450° F.

Carbon spur gears are fully machined and ground, dimensionally stable and resistant to mechanical and thermal shock. Chemically unaffected by a wide range of corrosive media, carbon gears efficiently handle lubricating and non-lubricating fluids. Pump can be steam or chemically sterilized. Self-lubricating carbon bearings eliminate all problems of product contamination.

The carbon gear pump is available in 2 sizes: to 2.5 gpm at 100 psi at 1750 rpm and to 10.0 gpm at 100 psi at 1750 rpm. Pump housings and shafts of Type 316 or Carpenter 20 stainless steel, nickel or Hastelloy C.

Write for complete data and state your requirements for immediate attention.

*Registered Trade Mark

ECO

the big name in small pumps

MArket 4-6565

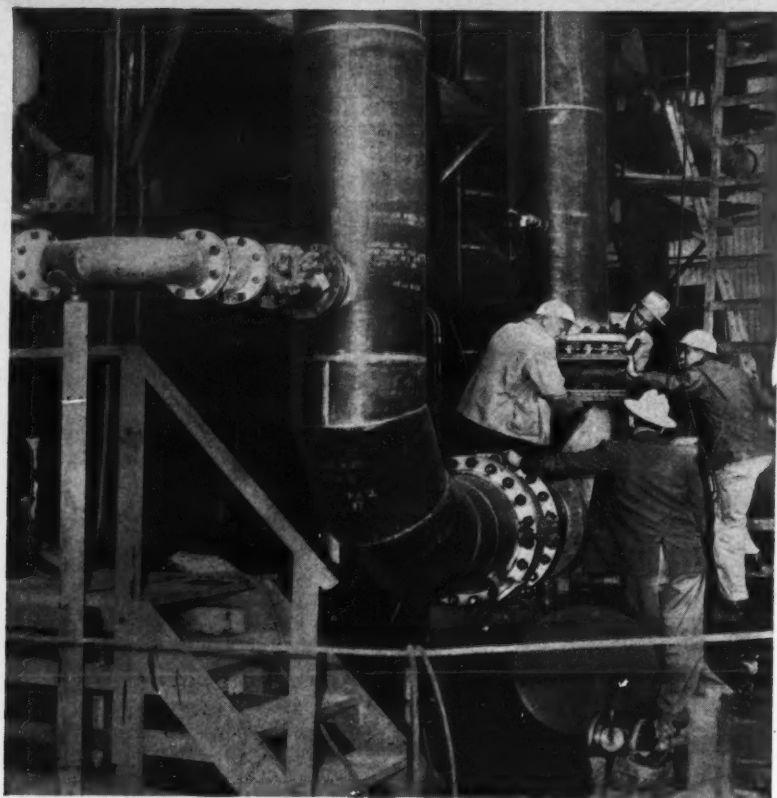
ENGINEERING CO.

12 NEW YORK AVE.
NEWARK, N. J.

Check 1744 opposite last page

OCTOBER 1958

Check 1746 opposite last page



Erecting pipe at a potash refinery in Carlsbad, N. M. operated by the U. S. Potash Co., a division of U. S. Borax & Chemical Corp. After nine months service, there is

no sign of stress-corrosion cracking—yet pipe and fittings were not stress-relieved or heat-treated during fabrication.

Field-fabricated without stress-corrosion cracking!

Pipe and fittings are of NEW AMPCO METAL GRADE 8

Forget your old ideas about fabricating copper-base alloy equipment to handle steam and corrosive media at elevated temperatures. New — *entirely new* — Ampco Metal Grade 8 changes all that!

Now, for example, you can get pipe and fittings that

- ... can be field-assembled, without stress-relieving — yet won't stress-corrosion crack!
- ... provide many times greater protection against corrosion and erosion
- ... can be readily welded

... can be formed on standard equipment

... are too tough to be chewed or crushed by wrenches.

... are available in all standard types and sizes — also specials.

At one major oil refinery, field-assembled piping of Ampco Metal Grade 8 has handled hot sulphuric-acid sludge for a year and a half without stress-corrosion cracking.

Sound promising? It is! Ask your Ampco field engineer about new, patented Ampco Metal Grade 8. Or write for details. *Ampco Metal, Inc., Dept. 131J, Milwaukee 46, Wis.* West Coast plant: Burbank, Calif. — Southwest plant: Garland (Dallas County), Texas.



AMPCO

Check 1747 opposite last page



Photos by CP Staff

HOT MERCURY AND BRINE Not Too Tough For SPECIAL RUBBER-LINED PIPE

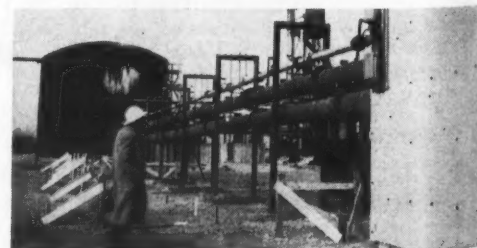
Carefully selected blend of polymers reinforced with resin resists the severe conditions for three years with no sign of trouble

GORDON WEYERMULLER
Associate Editor
with **H. M. FISHER**
Technical Advisor
and **A. P. FORTINO**
Foreman Chlor-caustic Plant
Pennsalt Chemicals Corporation
Calvert City, Ky.

Problem: Conventional rubber-lined pipe used at Pennsalt for handling hot mercury amalgam, and brine failed in 1 to 1½ years. In some cases, where bottom side of larger size pipes developed rubber blisters, plant would turn pipe 180° to obtain some additional period of service. Pipe was used in connection with de Nora cell installation used for manufacturing chlorine and caustic at the Calvert City plant.

Solution: About three years ago plant started using a new type of rubber-lined pipe spe-

Brine enters cell room through these large-diameter pipes, lined with a special blend of rubbers and reinforced with resin



CHEMICAL PROCESSING

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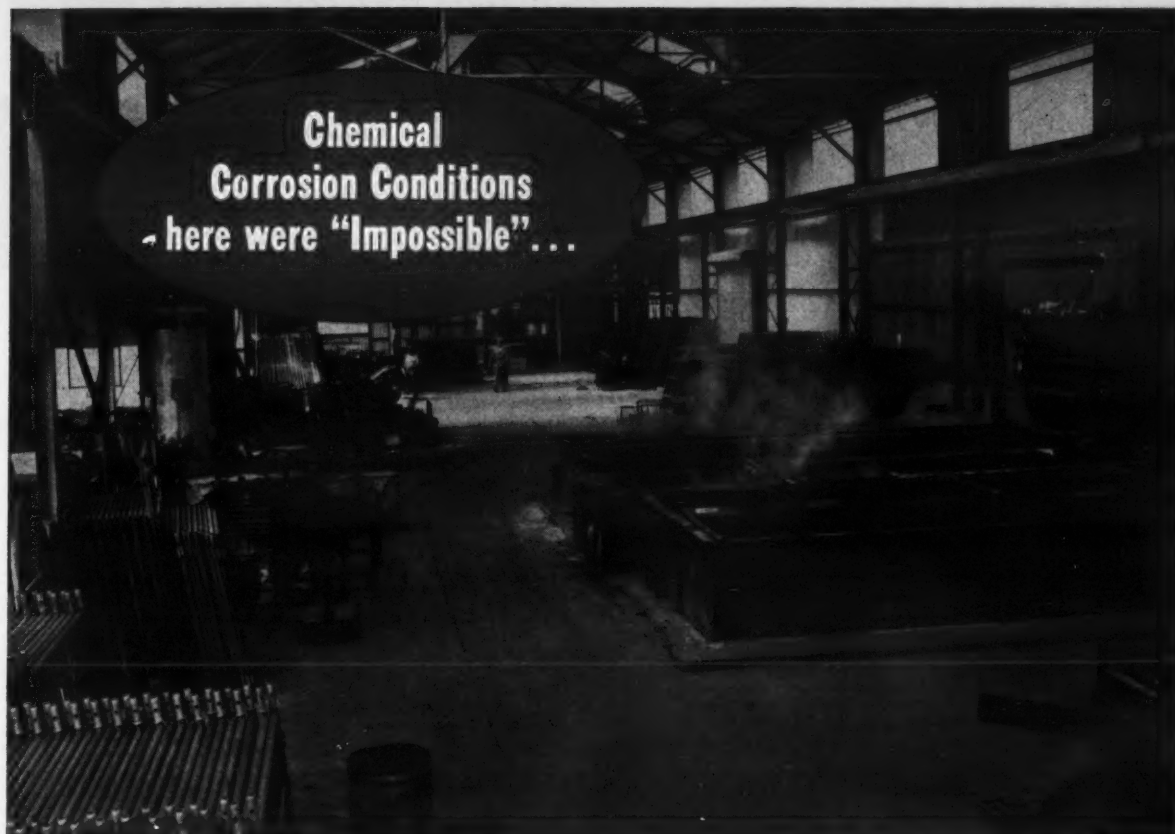
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OCTO

CORROSION CONTROL

Basement below mercury cell room at Pennsalt plant. In parked columns at left, sodium is separated from mercury and caustic is formed



cially designed to overcome the particular conditions encountered.

The 253-V lining used is of the flexible, semi-hard type, having a hardness of 70 to 80 Durometer Type D. It is a carefully selected blend of polymers, predominantly natural rubber with some synthetic rubbers, and reinforced with resin. Besides its high corrosion resistance under severe operating conditions, material has good thermal shock properties. The latter property permits it to be used in batch operations as well as for continuous service.

Choice of the material for the hot sodium amalgam return lines is due to its low permeability element, its freedom from chemical attack, and its guaranteed no-iron pickup. Caustic soda produced must be of a high purity, with low-iron tolerance.

Results: Special rubber-lined pipe is giving good service at Pennsalt. Pipe has been used with up to three years service with no evidence of rubber failure. In addition to resisting chemical attack, pipe prevents contamination, helping the plant to produce high-quality caustic.

(Type 253-V rubber-lined pipe is product of Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N.J.)

Check 1748 opposite last page.

But TARSET® Stopped the Attack!

THE extreme corrosion conditions found in this metal finishing plant are seldom surpassed! Pickling and plating equipment, as well as structural steel, is under constant attack from fumes and spillage of sulphuric, nitric and chromic acids and cadmium and zinc salts. After several other protective materials failed, Pitt Chem Tarset was applied and stopped corrosion in its tracks.

No other protective coating on the market today offers you the broad corrosion-resisting

properties and relatively low cost of this unique and patented Coal Tar-Epoxy Resin coating.

Wherever the going is roughest—on storage tanks, precipitator tanks, material conveyors and similar chemical plant equipment—you'll find Tarset is the recommended coating.

If you have a stubborn corrosion problem that you've labeled as economically "impossible" to control, it will pay you to investigate Tarset. Send today for complete technical data and samples for testing.

*Think First
of the Coatings
that Last!*

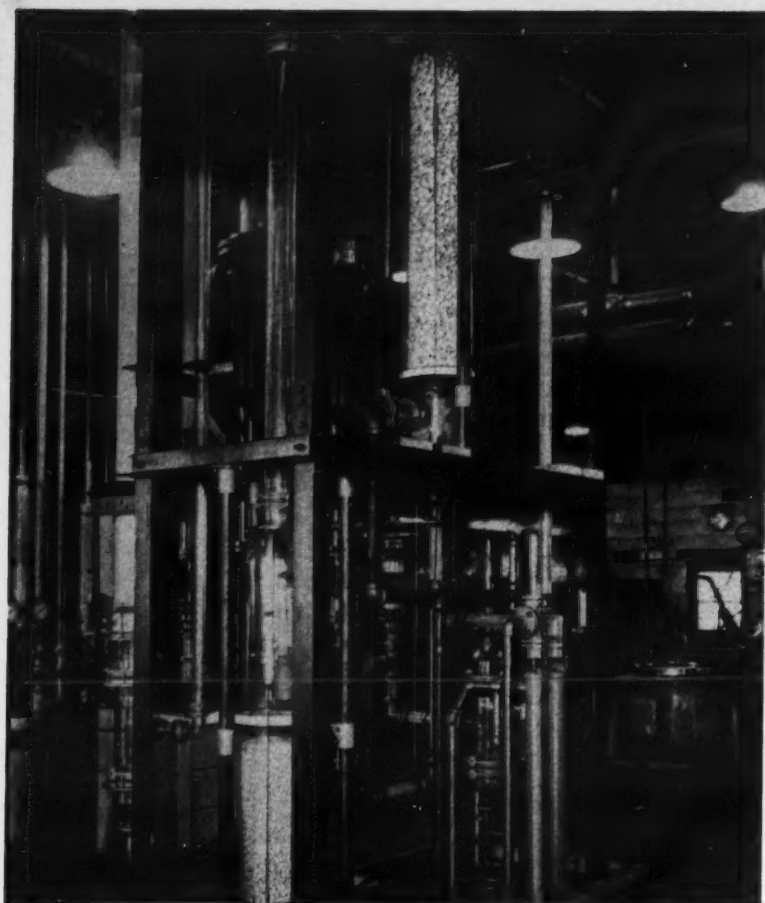
PITT CHEM
Coal Tar Coatings
PITT CHEM
"Insul-Mastic" Gilsenite Coatings
PITT CHEM
"Tarset" Coal Tar
Epoxy Coating

PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."



COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Check 1749 opposite last page



How Kay-Fries uses PYREX® Pipe to make fine organics finer

The difference between top-grade and just so-so fine organics is often a trace of impurity that sneaks in through absorption and scrubbing towers, or through cooling tubes and piping, or through heat exchangers.

Kay-Fries Chemical Company keeps such traces out of its distilled organics by using PYREX Pipe in *all* this equipment.

Of all the acids only hydrofluoric can corrode this glass and release impurities. Of all the alkalies, only those above pH12 have to be watched. *Maintenance practically nil.* The smooth inert surfaces of PYREX Pipe make scale and

sludge build-up highly unlikely.

Inspections are quick and sure since the equipment is transparent. Should any blocking occur, you can locate it and determine its nature exactly, then remove only the section that's affected . . . and removal is quick and easy.

A completely new bulletin on PYREX Pipe and other processing equipment tells more explicitly how this glass helps solve corrosion problems. It also reveals the ease of installation and maintenance that has made PYREX equipment a common sight in the processing industries.

Just ask for a copy of PE-3.



CORNING GLASS WORKS

310 Crystal Street, Corning, New York

Corning means research in Glass

Check 1750 opposite last page

CORROSION CONTROL

Good surface preparation provided by chemical treatments

Offer advantages over mechanical procedures

A number of methods are available to properly prepare the surface of a metal in order to achieve complete protection with a coating. Chemical treatments are often the best choice if all factors are considered.

There are still some who claim that oil need not be removed from a metal since the oil will blend into an oil-base coating. This is just as fallacious as the assumption that rust does not have to be removed prior to the application of a protective coating.

Oil, rust, scale, and dirt can be removed by sandblasting. However, in humid areas coating must be applied soon after sandblasting or rerusting will occur. Also, this method is quite expensive to use and leaves a rough surface that consumes additional quantities of a coating.

Steel wool can remove most of rust and scale, but may drive some of it into surface. Also short lengths of steel fiber may be imbedded in surface. This can cause galvanic corrosion after application of coating.

Among other cleaning methods are alkali wash, vapor degreasing, and solvent wash. These methods will clean surface but will not remove rust and scale. With first method, traces of alkali may be left on surface through improper rinsing. This will impair coating. Vapor degreasing, using chemicals such as trichloroethylene, is hazardous and somewhat expensive. Solvent wipe is not a thorough method.

Proper chemical treatments can provide everything needed for good surface preparation. Scale, rust, dirt, and oil can be removed. A film compatible with coating can be left behind. Some "tooth" is provided for promotion of good adhesion.

A phosphoric acid cleaner combination, such as Deoxi-

Uniform
Class 3 Fit

**BOLTS
NUTS
STUDS**

TITANIUM

- Carbon Steel
- Alloy Steels
- Stainless Steels
- Silicon Bronze
- Naval Brass
- Monel Metal

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

"The Bolt Man"

Check 1751 opposite last page
CHEMICAL PROCESSING

FOR CORROSIVE USES
LUZERNE
HARD RUBBER
 A Complete Line of
BUNA-N & NATURAL
RUBBER COMPOUNDS

Luzerne Buna-N heat-resisting synthetic hard rubber compounds are recommended for handling materials at temperatures up to 230° F. All the advantages of natural hard rubber plus added qualities of heat and oil resistance.

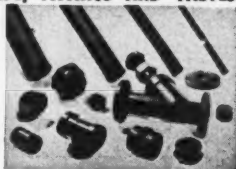
HARD RUBBER CUSTOM MOLDED



Specialists for over 50 years in custom molding hard rubber parts and components for chemical processing equipment and installations. Many compounds of both Buna-N heat resistant and natural rubber available for specific services and applications.

HARD RUBBER PIPE, FITTINGS AND VALVES

A complete line from 1/4" to 4". Pipe and flanges in larger sizes. Available in heat resistant Buna-N and standard compound.



New improved hard rubber valves, screw stem straightway, screw stem angle and globe valves, threaded or flanged. Plugcocks, straightway cocks, bibcocks, petcocks. Float valves, horizontal and vertical check valves. Available in Buna-N heat resistant compound or standard compound.

HARD RUBBER LINING



Metal tanks, metal pipe and fittings, special intricate metal parts and castings lined and covered with hard rubber. Special linings available for specific corrosive services.

HARD RUBBER PUMPS



Improved mechanical seal eliminates usual packing troubles. Capacities to 190 at 90 foot head. Available in Buna-N heat resistant compound or standard compound.

also

HARD RUBBER BUCKETS, FUNNELS
AND UTENSILS, HARD RUBBER
SHEET, ROD AND TUBE

Write for complete information
 For ready reference look us up
 in Chemical Engineering Catalog.

The LUZERNE RUBBER CO.

200 Mulrhead Avenue Trenton, N. J.

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 Chicago, Ill.

R. C. FOLTZ CO.
 Houston, Texas

Check 1752 opposite last page

CORROSION CONTRQL

dine 126 and 624, is one widely used, economical method of chemical treatment. Another is the iron-phosphating process using such a material as Duradine. This method is primarily designed for spray equipment.

Procedure which offers the ultimate in furnishing good adhesion is the use of Granodine M, which gives a zinc phosphate film. The Alodine process is probably the best one for aluminum surfaces.

(Condensed from technical paper, "General Practices of Metal Prepaint Preparation," which was presented at the Regional Meeting of the National Association of Corrosion Engineers held in Chicago in 1957. Paper was prepared by J. H. Geyer, Manager of Development Dept., Amchem Products, Inc., formerly American Chemical Paint Co. Further information on Deoxidine, Duradine, Granodine M, and Alodine chemical treatment processes can be obtained from Amchem Products, Incorporated, Ambler, Pennsylvania.)

Check 1753 opposite last page.

PVC fume scrubber
handles halogens,
other corrosives

Recently announced fume scrubber is fabricated entirely of unplasticized polyvinyl chloride. This plastic offers exceptional resistance to corrosive media including halogens, ammonia, hydrochloric and sulfuric acid fumes, and vapors from fats and oils.

In operation, water enters unit through PVC spray nozzle which is designed to provide an angle of spray most suitable for maximum entrainment. Velocity of water spray creates a draft in scrubber chamber and causes fumes to be drawn into it. Fumes are scrubbed by liquid, which is then discharged to separator.

(PVC fume scrubber is product of Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.)

Check 1754 opposite last page.

SULPHURIC ACID
PHOSPHORIC ACID
HYDROCHLORIC ACID
BLEACHES
ALUM SOLUTIONS
ANY CORRODENT!

Fibercast

Chemical PIPE and FITTINGS

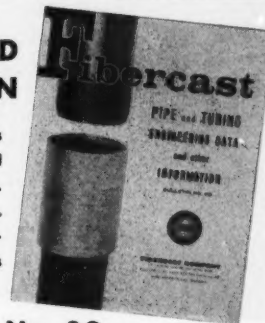
WILL NOT CORRODE—EVEN AT 300° F.

Fibercast, made from thermosetting reinforced epoxy resins, is long-term pipe economy, particularly where highly corrosive conditions are a constant, costly problem. Frequent replacement of piping used to handle corrosive liquids and gases is no longer necessary when Fibercast is installed.

Newly Published . . .

A COMPLETE DATA AND
INFORMATION BULLETIN

A comprehensive, 16-page bulletin that answers all general questions about Fibercast Pipe and Tubing. It covers such subjects as: What it is . . . Production Quality Control . . . Pipe Strengths . . . Engineering Data and Charts . . . Chemical Resistance . . . Specifications . . . Installation Procedures . . . Applications . . . Engineering Service.



Send Coupon for Bulletin No. 20

Here are a few of the many other Fibercast money-saving advantages:

- Lightness — minimum installation cost
- Easy fabrication on location
- Takes high temperatures
- 18-ft. support span
- 20-ft. joint lengths
- Standard iron pipe O.D.
- Standard A.S.A. flanges

FIBERCAST COMPANY

A Division of The Youngstown Sheet and Tube Company
 Box 727, Sand Springs, Oklahoma



Manufacturers of
 Non-corrosive
 Pipe and Fittings

FIBERCAST COMPANY

Box 727, Sand Springs, Okla., Dept. 8108

Send your new Data and Information Bulletin No. 20; also other specific data for _____ application.

Name _____ Title _____

Company _____

Address _____

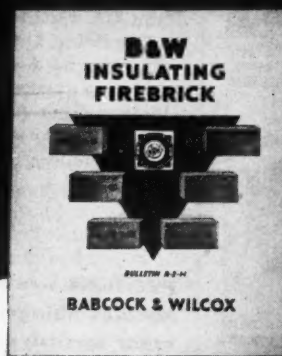
City _____ State _____

Check 1755 opposite last page

Why B&W IFB for Oil Heater Linings

?

- Lightest weight
- Simplified construction
- High hot load strength
- Lower conductivity
- Lower heat storage
- Better process control



The light weight of B&W Insulating Firebrick provides savings in capital investment in several different ways. The light weight of B&W IFB permits thinner wall constructions of equivalent insulating value. These thinner, lighter walls mean real savings in structural steel and concrete. Construction is further simplified because B&W IFB's high hot load strength makes possible higher unsupported walls without deformation at furnace operating temperatures. In addition B&W IFB can

be cut and shaped with ordinary wood working tools, simplifying field installation.

The light weight of B&W Insulating Firebrick also provides the greatest insulation. Thus, they save more fuel.

Light weight also means lower heat storage. B&W IFB protect you against burn-out of expensive alloy tubing in the event of forced shutdown. B&W IFB respond faster to changes in firing rate, too, assuring you of more positive process control.

**Write for Bulletin R-2-H giving more data on B&W Insulating Firebrick.*

B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick
B&W Insulating Firebrick • B&W Refractory Castables, Plastics and
Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool



Moved Recently?

If you have, you will want to make sure that your copy of **CHEMICAL PROCESSING** will continue to come to you on time.

Maybe . . .

you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of **CHEMICAL PROCESSING** will follow you.

Fill out . . .

the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at left, specify 1756 see information request blank opposite last page.

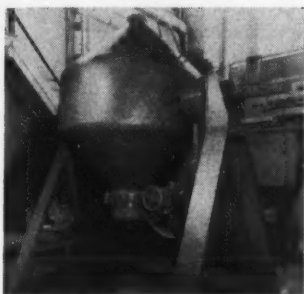


CORROSION CONTROL

Rotary dryer-blender prevents corrosion and contamination

Uses: For drying and blending a broad range of corrosive and heat-sensitive materials.

Features: Glass lining resists attack by corrosives up to pH of 12 at 210°F excepting hydrofluoric acid.



For efficient and economical drying and blending of corrosives

Description: Conical rotary dryer-blender can be furnished with both acid and acid-alkali glass linings. Jackets are suitable for operating pressure of 65-75 psi. Condensate is drawn from bottom of jacket. Unit is offered in standard sizes from 5 to 35 cu ft, with larger capacities up to 255 cu ft on special order.

(Glass-lined dryer blender is product of Glascote Products, Inc., subs. of A. O. Smith Corp., 20900 St. Clair Ave., Cleveland 17, Ohio.)

Check 1757 opposite last page.

Polypropylene sheets now available

Polypropylene sheets, which offer resistance to heat distortion at temperatures up to 221°F, along with excellent corrosion resistance, are now available. They are suitable for manufacturing tank liners, exhaust ducts, and fume hoods.

(Polypropylene sheets are product of Seiberling Rubber Co., Akron 9, Ohio.)

Check 1758 opposite last page.



"YOU CAN BE REPLACED But Our P.F.I. Standards Can't"

- 1 Machining Backing Rings for Butt Welds
- 2 Dimensioning Welded Assemblies
- 3 Linear Tolerances Bending Radii
- 4 Shop Hydrostatic Testing
- 5 Cleaning Fabricated Piping
- 6 Built-up Weld, Metal Bosses
- 7 Welded Nozzles—Spacing
- 8 Preheat-Postheat Before, After Welding
- 9 Arc-Welding Dissimilar Ferritic Steels
- 10 Stress Relieving Practices



Sure it's aggravating not to find what you are looking for . . . when you need it.

But, Sir, it's easy to replace your missing file of P.F.I. Standards, just write the Institute's headquarters in Pittsburgh, using the coupon below.

While these Standards are packed with vital data on the design, fabrication and erection of industrial and high pressure—high temperature piping, they do not explain the many advantages of shop fabrication.

Shop fabrication by firms responsible for the development of P.F.I. Standards is your only real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned . . . in any metal as a component or a complete assembly.

Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful to you.

THE PIPE FABRICATION INSTITUTE

Devoted to the Technical and Economic Problems in Piping

ONE GATEWAY CENTER, PITTSBURGH 22, PA.

Please send me the P.F.I. Standards indicated

1 2 3 4 5 6 7 8 9 10

CP

Name _____

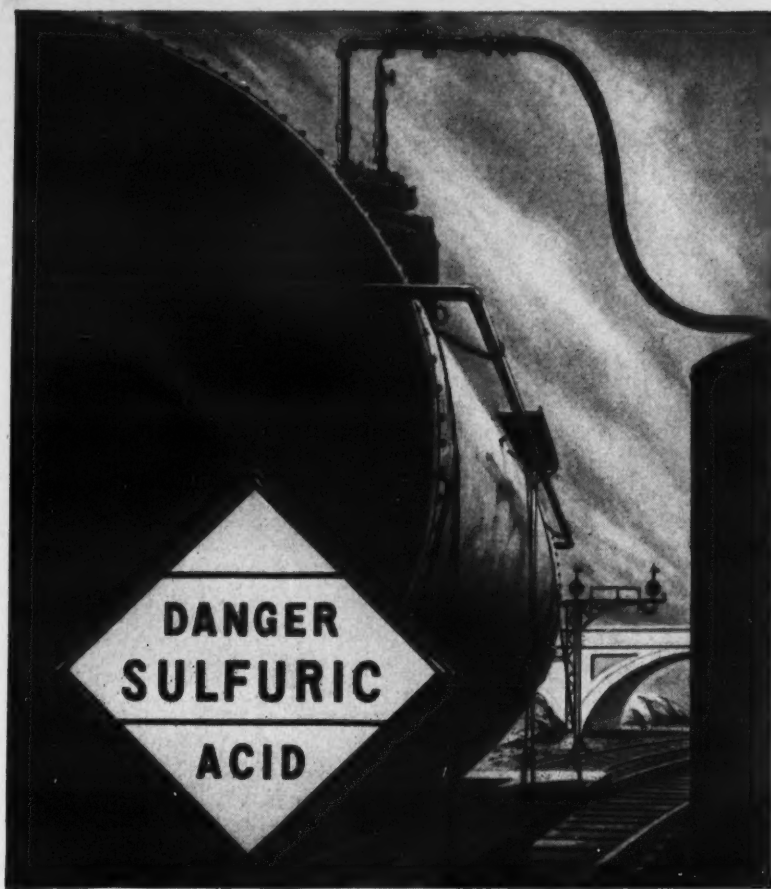
Company _____

Address _____

City _____

State _____

Check 1759 opposite last page



Transferring concentrated sulfuric acid with Quaker Hypalon Acid Hose.

CONCENTRATED SULFURIC ACID CAN'T HURT THIS HYPALON HOSE

Neither can nitric, phosphoric, or hydrochloric acids, to name a few. Reason? The inner lining of Quaker Hypalon Acid Hose is made of HYPALON*, a chlorosulfonated polyethylene synthetic. Hypalon checks acid attack before it can begin. The hose stays soft and supple—easy to handle. You get more mileage for your hose dollar.

Some of the acids Hypalon will carry

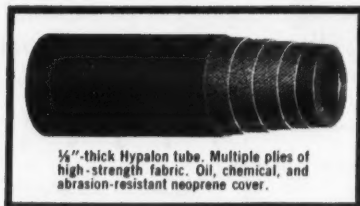
Acid	Max. Temp.	Max. Concentration
Hydrochloric	150° F.	37%
Nitric	R.T.	70%
Phosphoric	120° F.	85%
Sulfuric	R.T.	98%

Hypalon is reinforced with multiple plies of medium-weight duck, frictioned with highest-quality com-

pounds. Rugged Neoprene cover is slow-aging and abrasion resistant.

To learn how Quaker Hypalon Acid Hose can save you more money, call your local Quaker distributor, or write *Quaker Rubber Division, H. K. Porter Company, Inc.; Philadelphia 24, Pa., or Pittsburg, Calif.*

*Reg. T.M. E. I. DuPont de Nemours & Co.



1/4"-thick Hypalon tube. Multiple plies of high-strength fabric. Oil, chemical, and abrasion-resistant neoprene cover.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

Check 1760 opposite last page

CORROSION CONTROL

**Teflon-lined pipe
helps plant save
\$60,000 per month**

Enables corrosive process to stay on stream

Problem: Excessive maintenance costs and product losses ran as high as \$60,000 per month during first six month's operation of process at Du Pont's Niagara Falls plant.

The process for the manufacture of a chemical intermediate involves handling hydrochloric acid and organic liquids at temperatures exceeding 275°F. In the past, the highly corrosive properties of this combination had restricted material of construction to non-metallics.

Laboratory work established that many potential advantages could be obtained by increasing operating pressure from a normal level up to several atmospheres. However, a new material of construction would be required for the high pressure service.

An exhaustive search for satisfactory piping materials included a number of alloys, plastics, and other types of materials. The most promising of these were installed. In spite of this program, such frequent failures occurred that on-stream time averaged only 75% during the first six months' period of operation.

Solution: It was found that two experimental lengths of steel pipe lined with Teflon TFE-fluorocarbon resin had been placed on test previously. Both had provided excellent service for 24 months at 230°F and 10 psig. Both were then reinstalled in the new pressure system and were in operation for several more months without failure.

Based upon this and other encouraging results, conversion to steel pipe lined with TFE resin began as soon as it became commercially available. Plant now has more than 1500 feet of the lined pipe in service. Most of it is of 2" size although some up to 6" in diameter is in use at the Niagara Falls plant. More than 400 Teflon TFE-fluorocarbon lined fittings are in use at the plant.

CHEMPRO makes them all in Teflon!



RING TYPE PACKINGS



ASBESTOS PACKINGS



V-TYPE PACKINGS



FLEXIBLE SEAL CAGES



JACKETED GASKETS



SOLID RING GASKETS

CHEMICAL & POWER PRODUCTS, INC.
9 Broadway, New York 4, N.Y.

Check the Bulletins you want:

- ☐ Packings & Seal Cages
- ☐ Gaskets
- ☐ Teflon Stock & Special Molded and Machined Parts

Name _____

Company _____

Street _____

City _____ State _____

Check 1761 opposite last page

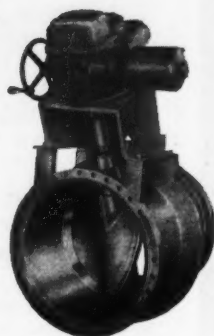
CHEMICAL PROCESSING

Your plant needs ROCKWELL VALVES



like these

"Kwikleen" slide valve for powdered coal, granular materials, flue gases with high solids content, etc.; solids accumulations easily cleaned out by removing bottom plate.



"Stress-seal" butterfly valve for tight shut-off of hot, corrosive or dirty gases to 1300° F. and higher, at 200 p.s.i. Alloy stress band in valve body is inflated by external gas pressure to effect tight seal.

Butterfly valve with simplified bracket and linkage to air operator and valve disc positioner; provides maximum adjustment, minimizes friction, eliminates backlash, chatter and hunting, reduces power requirement in close control applications.



"Slim-Jim" wafer type butterfly valve for low pressure air, gas or liquids; low cost, light, simple, space-saving, easy to install.

What's your valve problem?

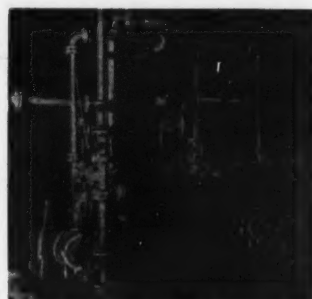
W. S. ROCKWELL COMPANY

2208 ELIOT STREET
FAIRFIELD, CONN.

Check 1762 opposite last page

CORROSION CONTROL

Results: No failures of the lined pipe have occurred. Some of it has already been in service more than 15 months. Outstanding performance of the lined pipe under the severe conditions has been a major factor in saving the \$60,000 per month that was being lost through excessive maintenance and loss of product. Use of the line pipe promises to make the process as reliable as those with no spe-



Hydrochloric acid and organic liquids at elevated temperatures and pressures are not too tough for lined pipe in service at Du Pont Niagara Falls plant

cial materials of construction problems.

In the petroleum industry, pipe lined with Teflon has been found to be quite useful for handling hydrofluoric acid at elevated temperatures and pressures. Line pipe has also proved valuable in chlorination, sulfonation, and nitration processes. Method used by manufacturer for lining pipe compensates for thermal expansion of liner to the extent that fatigue problems and reduction in flow diameter are eliminated.

(Fluoroflex T pipe and fittings lined with TFE-Fluorocarbon resin are manufactured by Resistoflex Corp., Woodland Rd., Roseland, N.J.)

Check 1763 opposite last page.

Corrosion keys on titanium, listing the resistance of the metal to 80 corrosives, is shown in eight-page bulletin. Properties of titanium tubing and pipe are described. Working instructions for machining, forming, are included. Bul on titanium tubing and pipe — Alloy Tube Div., The Carpenter Steel Co., Union, N. J.

Check 1764 opposite last page.

Fansteel Corrosiononomics

REGISTERED U. S. PATENT OFFICE

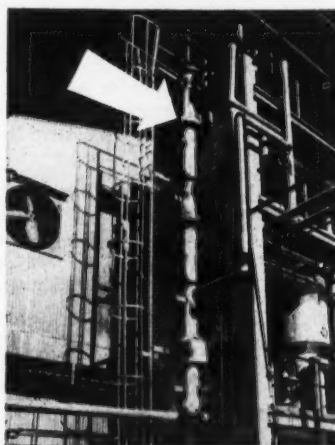
A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

TANTALUM HEAT EXCHANGER SOLVES HIGH TEMPERATURE HNO₃ PROBLEM

Commercial Solvent's plant at Sterlington, La., produces flake ammonium nitrate by neutralizing nitric acid with anhydrous ammonia. The reaction takes place at 400-460°F., driving off water introduced with the acid. A key piece of equipment in this operation is a Fansteel tantalum heat exchanger which has been giving outstanding service with no visible corrosion noted over a number of years.

Handles HNO₃ at 45 Gal/Min

This Fansteel equipment handles up to 45 gal/min at elevated temperatures with a heat transfer coefficient greater than 550 Btu/hr/sq ft/°F. It is made of three 8-ft. sections in series. If one unit must be removed the other two may be coupled and run at reduced flow. Each unit consists of a bundle of 19 straight tantalum tubes, 1/2" O.D. and with a 0.015" wall. This gives 20 square feet of heat transfer surface for each section.



Shown without lagging, three-section tantalum heat exchanger raises nitric acid temperature to 330°F.

*Registered trade mark, E. I. duPont de Nemours & Co., Inc.

For further data on the above, write:

FANSTEEL METALLURGICAL CORPORATION
CHEMICAL EQUIPMENT DIVISION

NORTH CHICAGO, ILLINOIS, U. S. A.

Check 1765 opposite last page

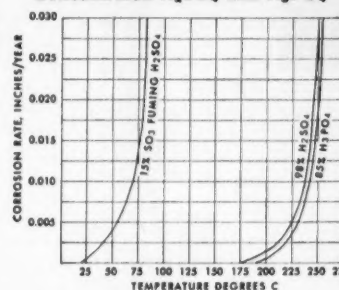
Corrosion Rate Nil in HNO₃

Montecatini, the huge Italian chemical company in Milan, exposed tantalum to 98% HNO₃ containing 0.1% H₂SO₄, 0.4% nitrogen oxides and 1.5% H₂O at 132°C for 762 hours. The corrosion rate was 0.00002 inches per year and the metal was unchanged in appearance. Tests by other companies confirm the low corrosion rates of HNO₃ in all concentrations even at elevated temperatures—as high as 200°C.

"U" Tube Bundles Also Available

Fansteel heat exchangers are also available with "U" tube bundles where processing or physical requirements call for a unit with input and output at the same end. No internal gaskets are used, which makes the leakage problem nonexistent. Teflon* grommets support each tube in the baffle holes and permit free movement, thereby eliminating the differential expansion problem.

Tantalum Also Resistant to Concentrated H₂SO₄ and H₃PO₄

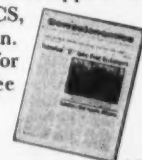


Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

Free Technical Information

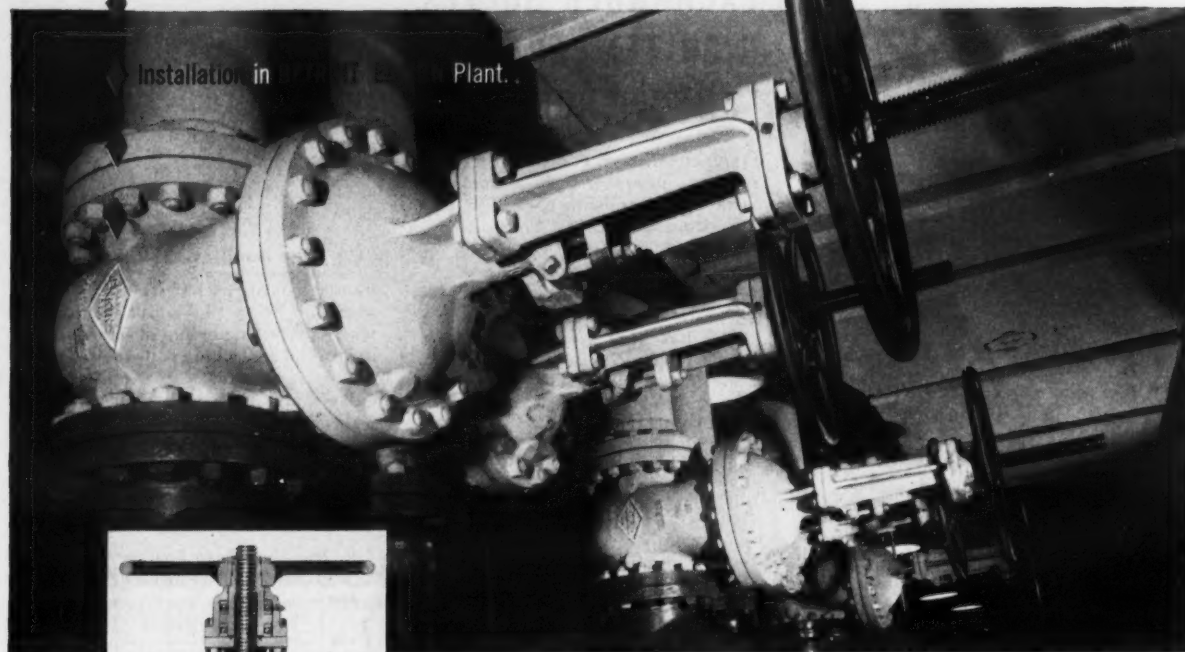
The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.



Q384A

where they really know Costs

—you'll likely see the famous
Jenkins mark on CAST STEEL Valves



Installation in Plant.

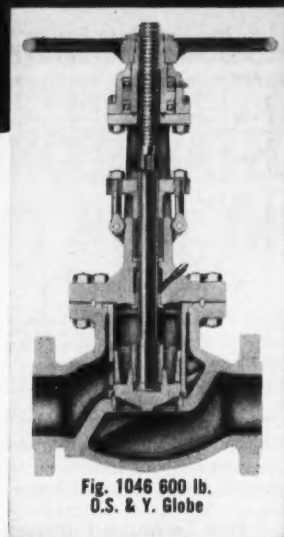


Fig. 1046 600 lb.
 O.S. & Y. Globe

Typical Jenkins features deliver lasting economy

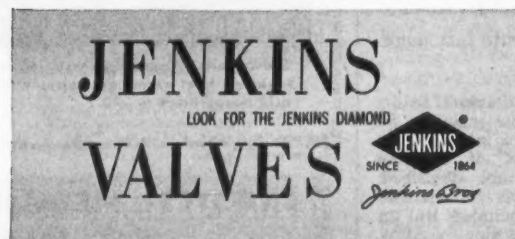
A ball bearing yoke sleeve is standard on larger sizes • Cooling chamber and plugged connection for test purposes is regularly provided below packing box, but a lantern gland stuffing box is optional • Rustproof, lubricated and graphited, wire reinforced packing is standard • Soft steel ring joint body-bonnet gasket, fitted into accurately matched grooves to assure a vapor-tight joint • Seating is regrind-renew type.

In the power generation and industrial processing plants where Cast Steel valves are numbered by the score . . . where replacement and maintenance costs are recorded to the last penny . . . the true economy of Jenkins Valves is clearly seen.

Records will always show the extra value which Jenkins builds into Cast Steel valves, not only with design features you can see but also with unbending quality standards for alloys, castings, machining. Plus the toughest known testing and inspection system to assure perfection in every detail, and safety factors far beyond ratings.

Select from the Big Line in this Catalog. It includes pressure castings of Carbon, Carbon-Moly, 1¼% Chromium-Moly, 4% — 6% Chromium-Moly, 3½% Nickel . . . alloys that meet a wide variety of specifications. Also, a wide choice of patterns, sizes and seating material combinations to satisfy your different service conditions.

CALL YOUR JENKINS DISTRIBUTOR for a copy of Jenkins Cast Steel Valve Catalog and prices. Or write to Jenkins Bros., 100 Park Ave., New York 17.



Sold Through Leading Distributors Everywhere



CORROSION CONTROL

Design of valve permits use of any plastic

All parts exposed to flow
 are corrosion-resistant

Uses: As a valve in services where corrosion resistance is desirable.

Features: Design of valve permits incorporation of any plastic in fabrication of all parts exposed to pipeline flow.

Description: Steel facing plates on round-port gate unit and full flanges prevent deflection and creep. Valve can be fitted with victaulic coupling ends. Sizes from 2 to 24" are available.

(Fabri-Plastic valve is a product of Fabri-Valve Co. of America, PO Box 4352, Portland 8, Ore.)

Check 1767 opposite last page.

Rust action prevented, good bond provided by metal treatment

Problem: Signs of rust showed up on beer storage tanks at the Heidelberg Brewery, Tacoma, Washington, within a few months after they had been repainted. This rusting condition occurred despite the care that was taken in painting the tanks.

The painting procedure used was as follows: 1) The tanks were disk-sanded to a "satin" finish. 2) Two coats of thinned red lead were brushed directly on the bare metal. 3) A prime coat was brushed on. 4) Two finish coats were applied.

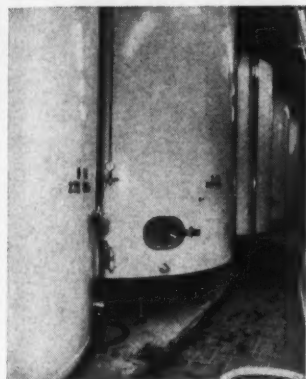
Storage tanks are located in a humid room and, for sanitary reasons, must be washed down with water several times daily. Caustic cleaners are not used and the tanks are not heavily scrubbed. However, frequent hosing down with water plus the high humidity caused penetration of moisture vapor through the layers of paint. This caused rust points to form on the metal underneath the paint. Once started, the rust spread rapidly, necessitating costly and premature maintenance.

Solution: Now, a coat of

Check 1766 opposite last page

CORROSION CONTROL

metal treatment material is applied to the bare metal immediately after sand blasting. This material is a balanced formula of orthophosphoric and dichromate with extenders and wetting agents. The water-thin liquid is brushed on and allowed to dry. Then successive coats of red lead,



Beer storage tanks resist rust action under extremely wet and humid conditions after application of metal treatment material

primer, and finish paint are applied as before.

Results: Metal treatment material is reported to provide an excellent base for paint coats, as well as inhibiting the development of rust for a much longer period. After more than a year of service, tanks treated with this material remain in excellent condition, with no indication of rust.

(Ospho metal treatment material is product of Rusticide Products Company, 3125 Perkins Ave., Cleveland 14, O.)

Check 1768 opposite last page.

Alloy has high strength at 1800°F

Also has good resistance to oxidation

Recently announced nickel alloy is unusually strong at elevated temperatures. Ultimate tensile strength on material in sheet form at 1800°F is 35,000 psi. At lower temperatures, tensile strength is greater — being 180,000 psi at 1000°F. Wire and bar stock are

available in addition to sheet.

Alloy also has good oxidation resistance up to 1800°F. Tests in slow moving air indicate less than one mil attack on surface during a 100 hr exposure. Metal contains about 50% Ni, 18-20% Cr, 10-12% Co, 9-10.5% Mo, 3-3.30% Ti, and other alloying elements.

(Rene 41 alloy is product of Cannon-Muskegon Corp., 2875 Lincoln St., Muskegon, Mich.)

Check 1769 opposite last page.

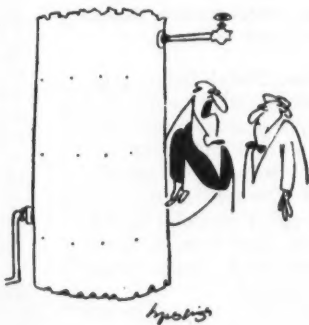
Polyisobutylene lining for oxidizing solutions

Announcement is made of the development of a 5/32" tank lining based on polyisobutylene. Lining is suitable for oxidizing solutions, particularly nitric acid and hypochlorites.

As a result of its simple application and because it does not need curing, cost of lining is comparatively low. It has good chemical resistance, does not sun check or crack, and can be used at low temperatures. Field application is feasible.

(Polyisobutylene tank lining is product of Automotive Rubber Co., Inc., 12550 Beech Road at P.M.R.R., Detroit 39, Michigan.)

Check 1770 opposite last page.



"The top's corrosion, . . . the bottom's mice . . ."

PLASTIC PIPE AD WITH NO PICTURE?

Why
no picture:

Because almost all plastic pipe looks the same. You know yourself that looks can be mighty deceiving, and piping that goes wrong can be mighty expensive. A picture means nothing . . . but . . .

There are scores of brands of plastic pipe on the market . . . made of a dozen different kinds of materials. Most of it is labeled "corrosion-resistant" but the results may be good, bad or indifferent depending on your choice. A picture is no help. Here's what to look for instead:

The universal material? No such thing. No one plastic can handle all liquids and gases . . . no one has all the physical properties required of a truly universal pipe. Closest to it are Ace Riviclор (Rigid PVC) and Ace-Ite (rubber-plastic blend). The former is a little better on chemical resistance, the latter is a little better on impact strength and heat resistance. Both same price.

Are plastics strong enough? Thousands of chemical plants say "yes". Pipe is now available in several wall thicknesses . . . in flexible tube sizes (Ace-Flex clear transparent), up through gas-tubing sizes (Ace-Ite and Ace Riviclор), through flexible Supplex polyethylene pipe, and Schedules 40 and 80 rigid plastic pipe for pressures up to 490 psi.

Above that, there's Ace rubber-lined steel pipe. And don't forget Ace soft-rubber-lined pipe for resistance to abrasion.

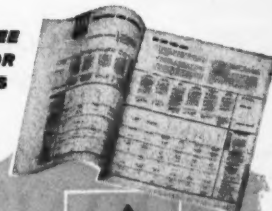
20 valuable pages . . . comparable properties, chemical resistance, costs, etc. of 11 plastics and rubber materials. Write today for Bulletin CE-50.

Where do I use it? For corrosive chemicals and gases of all types. The only ones that are difficult are certain solvents and chlorinated aromatic hydrocarbons, and if you're careful to pick the right one of the many Ace materials, you can even handle most of these tough corrosives. Use plastics, too, for water lines, gas lines, electrical conduit, etc., or any lines where the pipe passes through corrosive vapors or damp areas, or goes underground.

Is there a plastic for hot corrosives? Yes, Ace Tempron, which is good to 275 deg. F. with most chemicals. Stays chemical resistant, strong, and rigid where other plastics may be attacked or may sag.

How can I dodge "trial and error"? Go to a company that has no axe to grind. We, for instance, make no less than nine different kinds of pipe . . . with fittings and valves to match . . . and give you thoroughly unbiased advice backed by 100 years of experience and prices as low as you'll find anywhere.

**FREE
SELECTOR
CHARTS**



AMERICAN HARD RUBBER COMPANY

Division of Amerace Corporation

ACE ROAD • BUTLER, NEW JERSEY



Check 1771 opposite last page

It Costs Less to Send it Through "GOODITE" FLEXIBLE Rubber PIPE



*Corrosive or
Abrasive...Wet
or Dry...Hot or Cold*



LOWER INSTALLATION COSTS...

The unusual flexibility of "Goodite" permits installation in long, curving lines with few intermediate connections. Even the required connections are more quickly and easily made by the use of "Flang-Lok" Flanges (see insert) which also provide a non-metallic, permanently leakproof seal.

LOWER ULTIMATE COST FOR SERVICE...

"Goodite" is built to last longer under conditions generally conducive to costly maintenance, repairs and early replacement. Tube is highly resistant to extremely corrosive or abrasive materials, hot or cold, wet or dry: Patented wire-reinforced carcass will not kink, buckle or collapse. Cover is tough, long-wearing and impervious to the actions of acids and fumes. Standard sizes: 5" to 12". For smaller sizes, "Kemite Duct" has the same characteristics.

"If it's GOODALL, it MUST be Good!"

Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES.
IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

Check 1772 opposite last page

CORROSION CONTROL

**Check valves offer
positive, reverse
flow closure**

Uses: Unit is designed for liquid or gas service.

Features: Same positive, reverse flow closure as found with ball-type valve is offered.

Description: Piston-type check valves are available in brass or 303 stainless steel.



Piston-type check valves are available in brass or stainless steel

Series was designed to provide complete line ranging in size from 1/8 to 1/2" pipe thread as well as 1/4" Swagelok and 37° JIC Type flare tubing connectors.

Specifications are as follows. Maximum operating pressures: brass valve, 3000 psi; 303 SS valve, 5000 psi. Temperature limits: -40 to 200°F; O-ring; Buna-n synthetic rubber.

(Series 570 check valves are product of Hoke, Inc., 136 South Dean St., Englewood, New Jersey.)

Check 1773 opposite last page.

Polyethylene piping successfully holds undiluted acids

Former metal system failed in two years

Problem: Metal traps, pipe, and fittings were corroding and breaking away under influence of undilute acids, alkalis, and solvents in laboratories at Drexel Institute of Technology, Philadelphia, Pa. Equipment had been in service about two years when failures started.

Solution: Failing fixtures were replaced with units molded from polyethylene. They have high impact strength, excellent corrosion and thermal shock resistance.

ILLCO-WAY

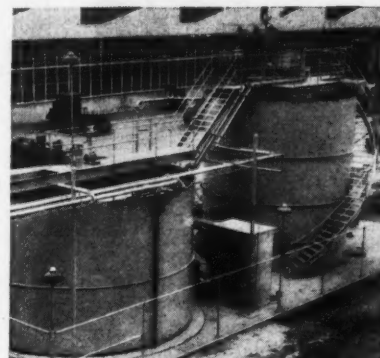
ionXchange

soften
de-alkalize
clarify

WATER

REMOVE

organic matter
turbidity
color
iron



U. S. AIR FORCE PHOTO

HIGH-FLOW, UP-FLOW CLARIFIER

The Clarifier shown above is part of an ILLCO-WAY ionXchange installation, at a metal-finishing plant, which is used for waste disposal and water recovery. Similar Clarifiers are widely employed to clear up surface waters used by various industries — removing organic matter, hardness, alkalinity, turbidity, color, and iron, as required by specific conditions.

USED AS PRE-TREATMENT

In many instances it is more economical to use a Clarifier in the initial part of a system. Certain water supplies contain organic matter or turbidity which can be removed most efficiently by flocculation, or contain carbonate hardness or alkalinity which can be largely reduced by precipitation — in which situations, a Clarifier is indicated as best. Let us analyze the water you propose to use, and advise you.

ILLCO-WAY

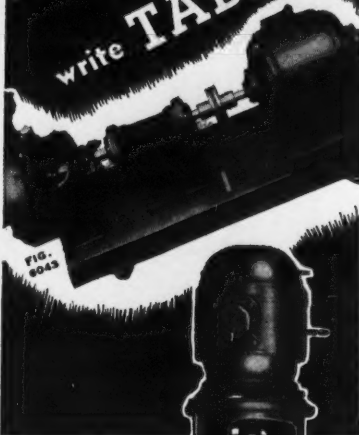
ILLINOIS WATER
TREATMENT CO.
840 Cedar St.
Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

Check 1774 opposite last page

CHEMICAL PROCESSING

PUMPS
of NICKEL, MONEL
or CHROME-NICKEL
ALLOYS but only for the
WETTED END
write **TABER**



Because at Taber, your PUMP NEEDS will receive the personal attention of highly specialized pump engineers... your objectives are most likely to be realized. Many of the oldest, largest and most respected producers in the chemical industry have and are using both Taber service and pumps.

NOTE, the vertical design pump permits locating stuffing box above and out of liquid level... nothing to leak. Horizontal Pumps, write for Bulletin C-355. Vertical, Bulletin V-837.

TABER
PUMP CO.

Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.

TABER

Check 1775 opposite last page

OCTOBER 1958

CORROSION CONTROL

Results: There has not been a single failure in new components of the system since they were installed over two years ago. Gradually, entire metal system is being replaced.

(Vulcathene polyethylene pipe and fittings are products of American Vulcathene Div., The Nalge Co., Inc., 625 S. Goodman St., Rochester 2, New York.)

Check 1776 opposite last page.

Rivet retains strength, resists oxidation up to 1800°F

Head is free of cracks

Uses: For service under high-temperature conditions.

Features: Rivets retain strength and resist oxidation up to 1800°F. Head is free of cracks, quality of metal is uniform, and rigid adherence to exacting dimensional requirements is maintained.

Description: Rivets are produced by cold heading process using wire drawn from centerless ground rod in order to remove surface imperfections



In an application such as on jet-engine after-burner, nickel-chrome alloy rivet glows red-hot throughout its service life

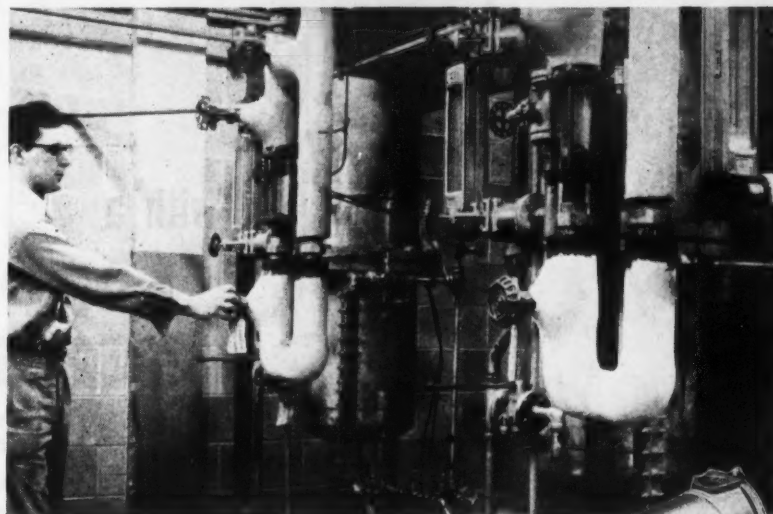
which would later show up as cracks or seams in head and shank. Exact operation of drilling tubular end is also done on specially designed automatic equipment.

Wide variety of rivet shapes and sizes in nickel-chrome alloy, stainless steel, and many other corrosion and heat resistant metals are available.

(Rivets are product of John Hassall, Inc., Westbury, L. I., New York.)

Check 1777 opposite last page.

Young Helps Tame Hot Nitric Acid!



Young

Stainless Steel Heat Exchanger lowers temp from 140 to 70F with minimum pressure drop!



The problem: How to recover 140F nitric acid used in development work at Abbott Laboratories? The solution: Install Young Stainless Steel Heat Exchanger to lower the acid temperature to a convenient 70F with minimum pressure drop. All component parts of the heat exchanger are constructed from #316 stainless steel and require little or no maintenance, even with liquids as corrosive as nitric acid. Tubes are rolled into header by an electronically controlled process making a highly efficient joint. The entire unit is engineered to withstand maximum expansion strains.

Ideally suited for use with highly corrosive liquids or gases, Young Stainless Steel Heat Exchangers are available in single or multi-pass units. If you have a corrosive cooling problem, consult Young Radiator Co. — without obligation.

Write for catalog 1258
Dept. 378-K



Young

RADIATOR COMPANY

RACINE, WISCONSIN

Creative **HEAT TRANSFER ENGINEERS**
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

Check 1778 opposite last page



NO LEAKAGE
NO PRIME LOSS
NO CONTAMINATION
NO STUFFING BOX

End Liquid Metering Problems

with a

Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

WRITE FOR BULLETIN 440
with typical applications, flow
charts, description and specification
of models of various capacities and
constructions. Inquiry Data Sheet
included from which we can make
specific engineering recommenda-
tion for your processing require-
ment. Write Lapp Insulator Co.,
Inc., Process Equipment Division,
3503 Poplar Street, LaRoy, N. Y.

• Precise metering, pumping, proportioning and feeding of hard-to-handle chemicals is the specialty of the Lapp PULSAFEEDER. Designed for accurate handling of corrosive and non-corrosive liquids, it is a combination piston-diaphragm pump... providing positive displacement with *no stuffing box*. Leakage or contamination of the liquid being pumped is prevented by a hydraulically balanced diaphragm isolating the liquid from the pump's drive mechanism. All pump parts contacting liquid are of special corrosion-resistant materials. Pumping speed is constant; variable flow results from variation in piston-stroke length, controlled manually by hand-wheel, or, in auto-pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

Lapp

Check 1779 opposite last page

CORROSION CONTROL

**One-piece glassed head,
glass-filled Teflon seat
cut valve maintenance**

Uses: For bottom outlet of glassed-steel reactors.

Features: One-piece glassed head and stem with glass-filled Teflon seat reduce maintenance and minimize product build up.

Description: All-glass interior flush valve is capable of



All-glass interior flush valve provides maximum protection against corrosion

withstanding same operating conditions as glassed-steel process equipment, and provides maximum protection against corrosion. There are no seams around the head, where a product could build up and contaminate succeeding batches in the reactor. Head cracking is virtually eliminated.

Rigidized glass-filled Teflon provides firm seating, and eliminates the need for lapping to maintain a proper seal. Glass is resistant to all acids, except hydrofluoric, even at elevated temperatures and pressures, and to alkalis at moderate temperatures.

(Glass flush valve is product of The Pfaudler Co., div. of Pfaudler Permutit Inc., 1064 West Ave., Rochester, N.Y.)

Check 1780 opposite last page.

Modified epoxy resin for severe corrosive services is explained in six-page bulletin, Bul A/4b — The Duriron Company, Inc., Dayton 1, Ohio

Check 1781 opposite last page.

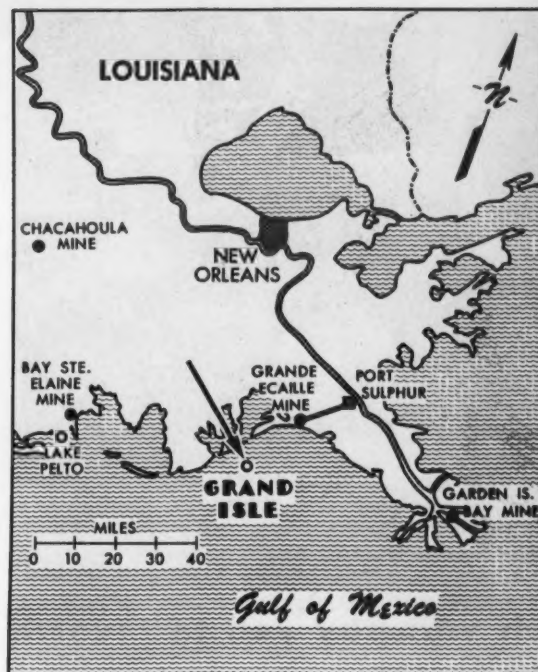


IDEAS: from other industries and nuclear field
— new trends in research processes, services

An above-average-interest construction project is now in full swing in the Gulf of Mexico — seven miles off the coast of Louisiana. Marking a milestone in the industry, when completed the \$30-million installation will obtain . . .

SULFUR —

From 'Davey Jones' Locker



Map shows location of huge off-shore Grand Isle sulfur deposits

THE world's first off-shore sulfur mining plant is scheduled to go into production sometime in 1960. Located seven miles off the coast of Louisiana in the Gulf of Mexico, the unique installation is being built by Freeport Sulphur Company at a cost of about \$30 million. Construction started in June 1958.

When completed, the project is expected to become one of the largest sulfur mining operations in the world. The deposits, known as Grand Isle, rank among the most important sulfur discoveries of recent years. They were discovered a few years ago by Humble Oil and Refining Company. Estimates are that they may yield over 1000 tons sulfur per day. Freeport and Humble will share the profits.

Man-made Steel Island

To obtain the sulfur from the giant deposit 2000 ft below, a Y-shaped steel island, nearly a mile long and rising 55 ft above the water, is being built. Five large and ten smaller steel-pile towers, connected by 200-ft long bridge spans, will form the structure that will be securely anchored to the gulf's bottom, 50 ft below

low surface of water.

Sulfur will be mined by the Frasch process. The five large towers will support the major components of the plant — the sea-water heating plant, three drilling platforms, and the living quarters and recreational area. The ten smaller towers will support the bridges between the main units.

The plant will use 13 million cu ft of gas to heat 5 mil-

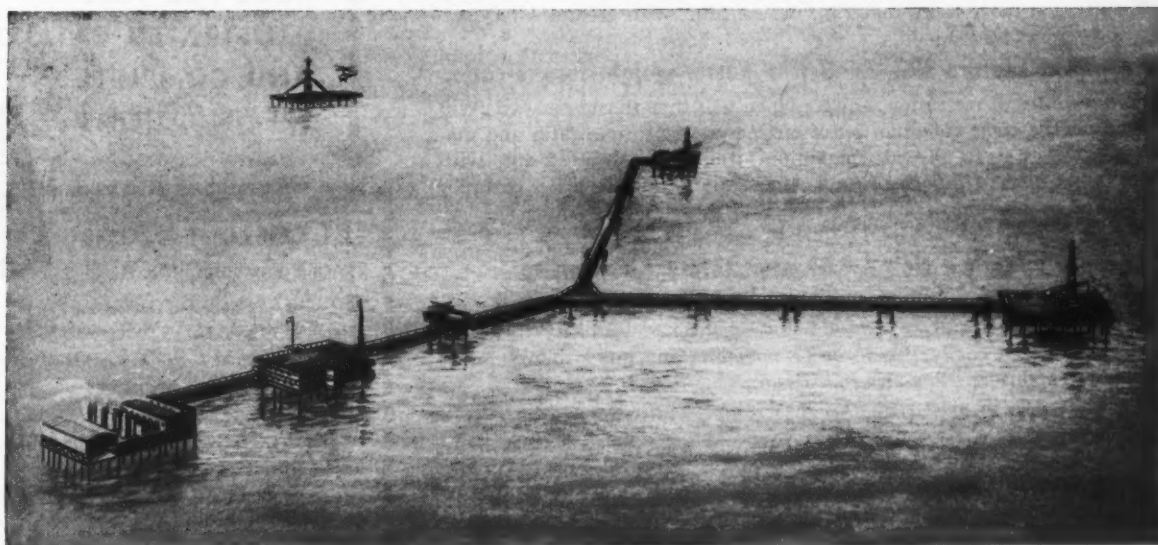
lion gal of sea water a day to 325°F for injection into the underground sulfur formation. Company's patented sea-water treating process will make it possible to heat the required vast quantities of water with minimum of corrosion and scaling. The firm originally developed the process to treat brackish water at its Bay Ste. Elaine Mine (see map).

Waste mine water return-

ing from sulfur dome will be treated and diluted with fresh sea water before being dumped into the gulf. Sulfur will be moved to the mainland either by barge or through heated pipeline. Studies are still underway to determine best method.

The man-made steel island will be a home away from home for 260 men who will

To page 145



When completed the Y-shaped, man-made steel island will be nearly a mile long and rise 55 ft above surface of water



It will pay you to investigate these 3 ADVANCED FEATURES in the **CASE' W-9**

A free demonstration will quickly convince you that the Case W-9 Terraload'r has all the money-making features found in the most modern 4-wheel-drive loaders — **PLUS three major advances** that enable it to outperform competitive loaders costing up to \$1000 more. Here are the facts, which we'll gladly *prove* anywhere, anytime:

Advanced Feature No. 1 — Better balance and stability.

You won't find this feature in the specifications — **BUT** the minute you get behind the wheel of a W-9, *you'll know what we mean*. There's no bucking or raising rear wheels off the ground when loading... less tendency to dip forward or sway sideways when traveling or dumping. Result: you move more material, in less time, with greater safety.

Advanced Feature No. 2 — Better power-weight-torque-ratio.

Five minutes of operation will convince you that the 1¾-cu. yd. W-9 has just the *right combination* of engine power, torque ratio and machine weight — to provide maximum traction and break-out, with *minimum wheel slippage*. Result: higher daily output, lower costs for fuel and maintenance.

Advanced Feature No. 3 — Greater safety for operator.

Note that booms and cylinders on the W-9 *never pass the operator's compartment*. Result: operator has unobstructed visibility in all directions... can easily get on or off machine anytime... never needs to worry about catching arm in lifting mechanism.



121 in quality
for over 100 years

Like all Case Industrial wheel and crawler units, the W-9 Terraload'r is sold and serviced by reliable Case Industrial Dealers everywhere... is available on lease or easy monthly terms, with seasonal "skip-payment" privileges. Check today!

Read what these three Pit operators say:



"Best machine we've ever used"

"We like the Case W-9 Terraload'r better than any rubber-tired rig we've ever had on our job. We've found it extremely fast, easy to handle and easy on fuel. Dealer service is excellent and the price saving of around \$2000 — compared with the second best machine we tried — is like frosting on the cake."

Denny-Simpson Stone Co.
Harrisburg, Ill.

"Replaced two power shovels"

"The W-9 replaced two more expensive shovels and not only speeded up our truck-loading operation, but cut maintenance and operating cost. It's geared for greater speed and moves around the pit fast. Visibility is especially good."

William B. Taylor
W. B. Taylor Sand & Gravel Co.
Sharon, Pa.

"Doubled our production"

"We bought a W-9 to speed up our operation and cut down on help — and have found it is the best machine for the varied work we do. It strips overburden, stockpiles, loads trucks, and cleans up around the crusher. Our W-9 has increased our production 100%."

Herman Leukhardt
Leukhardt Supply Co.
Greenville, Pa.

MAIL FOR FREE ILLUSTRATED CATALOG AND COMPLETE SPECIFICATIONS



J. I. CASE CO., Dept. K1548
Racine, Wisconsin, U. S. A.

- ☐ Send free illustrated catalog and specifications on the W-9 Terraload'r
- ☐ I'd like to see a free demonstration on my job

Name

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Company

Address

City

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C-TL-217



PROBLEMS?

Interested in solving them?

Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each...

issue of **CHEMICAL PROCESSING** there are articles that will help you solve many of your operational problems. These "New Solution" stories appear in the "New Solutions" section which begins on page 43 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few. This issue may contain the answer you need.

For more information on product at left, specify 1782 see information request blank opposite last page.



Off-shore Sulfur

From page 143

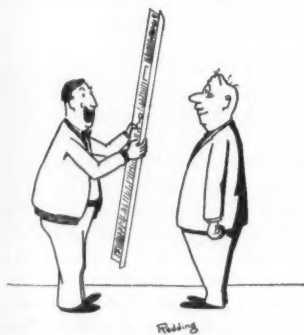
work five-day-on, five-day-off shifts. They will be transported to and from the island by company helicopters.

To assure safe, storm-proof, anchoring of the island, 250-ft long steel piles will be driven deep into the floor of the gulf. Once in place, the piles will be welded to a previously installed template (or framework) to form a unitized tower.

A total of 17 giant templates are being installed. The 115-ton units are lowered by crane to the muddy bottom. In addition to providing a pattern spacer and guide for driving the pilings, the templates serve as a means of stiffening the underwater portion of the piling against forces of hurricane winds and waves. Vertical members are 34" diam pipe, through which the steel piles are driven into the gulf's floor.

Two drilling platform units will be at the ends of the Y-structure's arms (see sketch). In addition to the derrick's from which directional wells will be drilled, facilities will be installed to collect and measure sulfur coming from the deposit. The third drilling platform will be some distance away from the main island.

(Information courtesy of Freeport Sulphur Company, 161 East 42nd Street, New York 17, New York.)



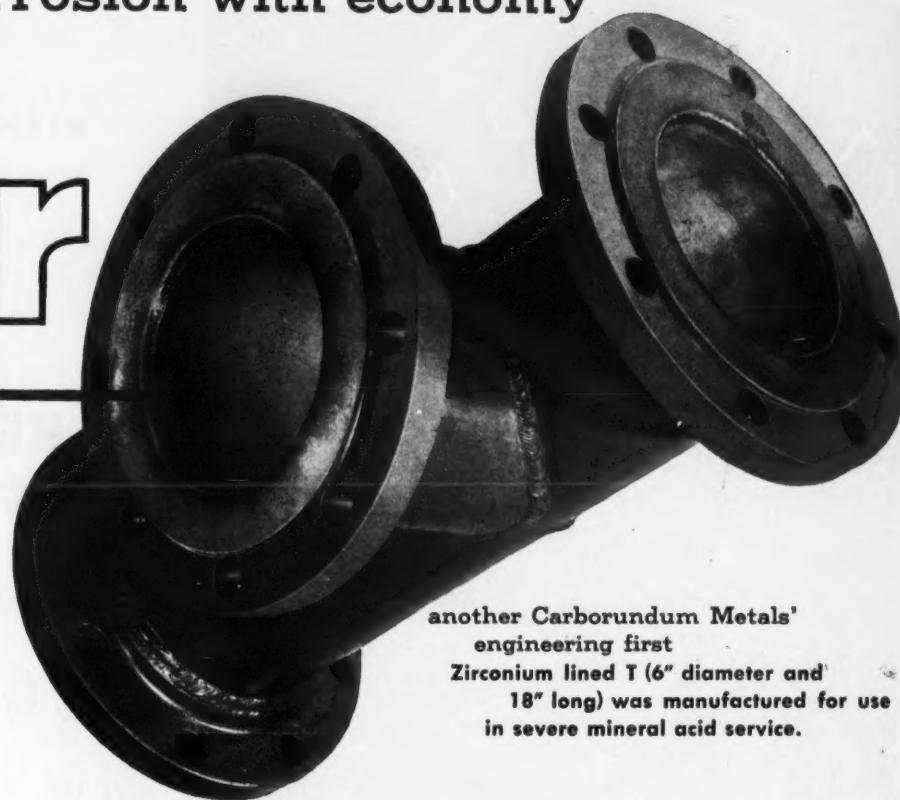
"Here are the specifications for that new vertical pump."

this flanged "T" fights corrosion with economy

Zr

on the
inside

(mild steel on
the outside)



another Carborundum Metals' engineering first
Zirconium lined T (6" diameter and 18" long) was manufactured for use in severe mineral acid service.

Zirconium liners are now available for a variety of basic processing components such as "T's", columns, tanks and reaction vessels. These liners provide all the versatile corrosion-resistance and outstanding nuclear properties of zirconium at surprisingly low cost. Rapid advances in zirconium manufacturing and fabrication techniques offer greater savings for:

THE CHEMICAL PROCESSING INDUSTRY—Dual resistance to corrosion...zirconium protects against either strong acids or caustics. Versatility means interchangeability and longer lasting system components.

THE NUCLEAR INDUSTRY—Zirconium's low neutron absorption and corrosion-resistance to coolants permits more economical fuel applications in almost every reactor design.

Carborundum Metals' fully integrated zirconium facilities and its close working relations with leading fabricators gives you *one* experienced source for every need in zirconium...from sponge metal to ready-for-service components. Firm quotations and delivery dates can be made immediately on commercial or nuclear grade sponge and ingot, and also on welded or seamless zirconium tubing, zirconium sheet, strip, bar, rod and foil.

"MORE Zr FACTS"...a publication devoted to progress in zirconium technology is distributed free of cost by Carborundum Metals. Ask to be placed on the mailing list...the next issue will concentrate on Zr Nuclear Properties and Applications.

Write today for complete price schedules on all zirconium products. Address inquiries to Dept. 91-808.

THE CARBORUNDUM METALS COMPANY, Akron, N. Y. • Division of THE CARBORUNDUM COMPANY

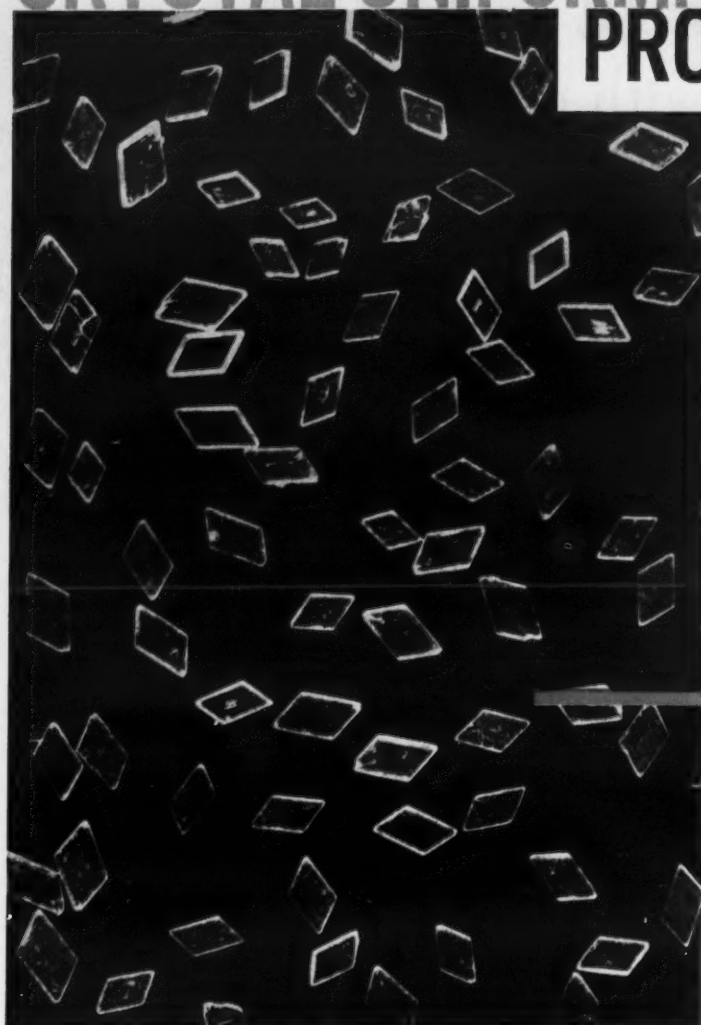
Production Pioneer of ZIRCONIUM

CARBORUNDUM

REGISTERED TRADE MARK

Check 1783 opposite last page

CRYSTAL UNIFORMITY PRODUCT PURITY



STANDARD WITH



**KRYSTAL®
CRYSTALLIZERS**

*a type for
every crystallizing
service*

The features you want . . . controlled crystal size and uniformity, product purity and economical operation are standard features of all Struthers Wells Krystal Crystallizers. And, there is a type and size suited to every crystallization operation.

These include evaporator crystallizers both open and closed types, vacuum type and cooling type for continuous operation, and

batch crystallizers for intermittent operation. All feature Struthers Wells' unique crystallization process which holds solutions under controlled supersaturation conditions that assure controlled crystal size and purity.

For further information, WRITE for Bulletin CE-57 or inquire about our pilot plant research services on crystallization problems.

IDEAS

**Water desalting plant
to furnish 28,000 gpd
to US city of 6000**

Will double community's
drinking water supply

First water desalting plant to serve a US city will be in operation by late 1958. Supplying 28,000 gpd to a community of 6000, plant operating by a continuous electrical process, is expected to save the city over \$400,000 in the next 10 years.

Installation will be at Coalinga, California, an oil and farming center in the San Joaquin Valley. City has had plenty of well water, but it has always been too salty to drink. Consequently, they have had to haul fresh water 45 miles by rail. The city has been doing this since 1900. Freight bill last year was over \$43,000 for a supply of about 17,000 gpd.

The new plant will expand drinking water supply 50%, by electrically removing sodium and chloride ions from the well water which contains about 1/15th as much salt as sea water. Special plastic membranes permit ions to pass through but retain the desalted water. Desalted water is pumped to water tower for distribution. Salts are flushed away as weak brine.

(Further information about water purification process may be obtained from Ionics, Incorporated, 152 Sixth Street, Cambridge, Massachusetts.)

Check 1785 opposite last page.

Laboratory listing

Directory of 60 pages compiled under auspices of National Science Foundation is the most recent available listing of 563 independent commercial laboratories performing research and development. To obtain copies of "Directory of Independent Commercial Laboratories Performing Research and Development, 1957", remit 40c direct to Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.



STRUTHERS WELLS CORPORATION

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Representatives in Principal Cities

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Crystallizers . . . Direct Fired Heaters . . .
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ing and Blending Units . . . Quick Opening
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ening & Back-up Rolls

Check 1784 opposite last page

CHEMICAL PROCESSING

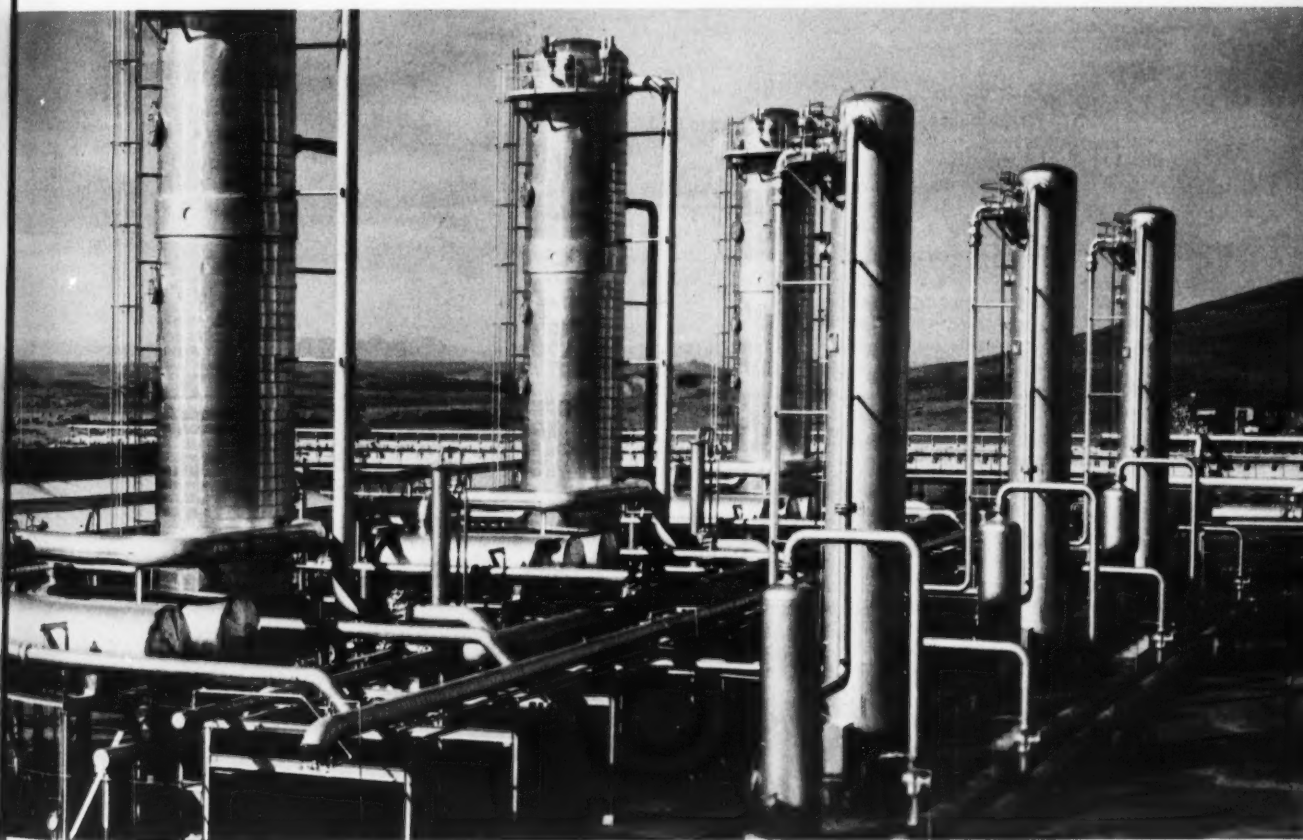
SPECIFICATION:

Process Equipment; Plant Structures; Transfer and Storage Equipment... shall be Alcoa Aluminum to resist corrosion

The one best answer to the process industries' problem of skyrocketing plant and equipment costs is to reduce corrosion damage. Fortunately there is a performance-proved way to do just that: specify Alcoa® Aluminum and ensure corrosion-resistant process equipment, transfer and storage equipment and plant structures.

No other metal matches the ability of aluminum to resist corrosive attack in so many operating environments. Happily, aluminum is usually the *least costly* metal able to serve satisfactorily in such situations. And aluminum, alone, provides the complete combination of important service benefits listed at the right.

*Light Weight • Great Strength
in Alloys • Good Workability •
High Thermal and Electrical
Conductivity • Nontoxicity •
Good Reflectivity •
Nonmagnetic, Nonsparking
Characteristics • Clean,
Attractive Appearance •
Low Cost*



On the following pages, you will find some of the many applications in which Alcoa Aluminum is daily being used to win the fight against corrosion in the process industries. Among them, you are sure to find ways in which *you, too*, can win this important battle.



SPECIFICATION: *Process Equipment; Plant Structures; Transfer and*

HEAT EXCHANGER TUBES

Low cost aluminum heat exchanger tubes combine initial equipment economies with freedom from chemical attack. Easy to fabricate, they have excellent thermal conductivity and are not subject to embrittlement at low temperatures.

Aluminum tubes have thoroughly demonstrated their ability to give long-lasting, dependable service in severe operating conditions. They have been used extensively in exchangers handling hydrogen peroxide, nitric acid, hydrogen sulfide, naval stores, glycerine, ammonia, hydrocarbons, steam acrylonitrile and many other chemicals. Alclad tubes are recommended for use with natural cooling waters.

Remember, too, that aluminum costs far less . . . $\frac{1}{2}$ the cost of admiralty, less than $\frac{1}{5}$ the cost of stainless, and even less than mild steel in common $\frac{3}{4}$ " and 1" sizes.

Write for booklet AD186 containing detailed information on heat exchanger tubes of Alcoa Aluminum.



This brazed aluminum assembly, weighing nearly 900 pounds, is typical of exchangers used in air separation plants and other low-temperature exchange processes.



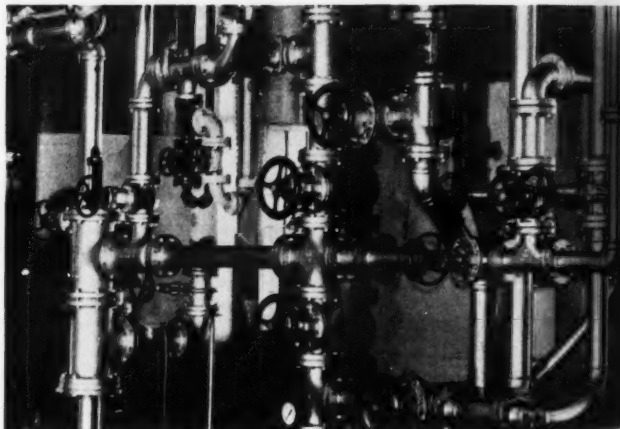
A 105,000 sq ft surface condenser with Alcoa aluminum heat exchanger tubes.

PROCESS PIPING

You get two-fold protection when you specify Alcoa Aluminum Pipe to carry liquids or gases in chemical, petrochemical, petroleum and food plants. It resists attack from the materials it carries as well as from corrosive atmospheres surrounding it. Naturally, the use of aluminum pipe will not introduce unwanted product contamination or discoloration.

Available in all normally produced schedules, Alcoa Aluminum Pipe is easily the lowest priced corrosion-resistant pipe available. For example, Schedule 40 aluminum pipe is $\frac{1}{4}$ the cost of Schedule 5 stainless and only $\frac{1}{7}$ the cost of Schedule 40 stainless.

For more information, Send for booklet AD197, *Aluminum Pipe and Fittings*.

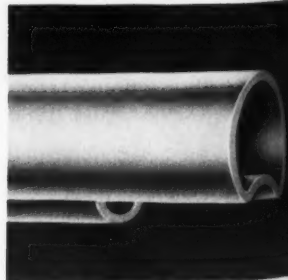
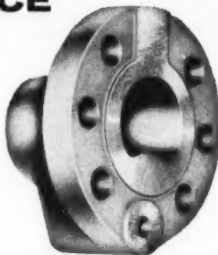


Alcoa aluminum pipe proved ideal to solve corrosion and product contamination problems in this processing plant.

UNITRACE

Only Alcoa makes available a complete line of components designed for Unitrace® which are compatible with conventional piping. With the recent addition of flange, Trace Cap, reducers and elbow fittings to the Unitrace line, it is now possible to design and install complete, fully integrated Unitrace steam-traced piping systems. Unitrace is the revolutionary steam-traced pipe of Alcoa Aluminum. Unitrace incorporates steam and product passages extruded in a single unit of aluminum alloy. It is available in diameters equal to 1½", 2", 3", 4" and 6" pipe.

Get complete information on low cost, highly efficient Unitrace components. Write for Bulletin AD418.



New type Unitrace section showing trace line cut back for joint. (Right) Special cast Unitrace flange for easy, efficient joining of new type Unitrace sections.

ALUMINUM COMPANY OF AMERICA

Alcoa Building, Pittsburgh 19, Pennsylvania

fer and Storage Equipment . . . shall be Alcoa Aluminum to resist corrosion



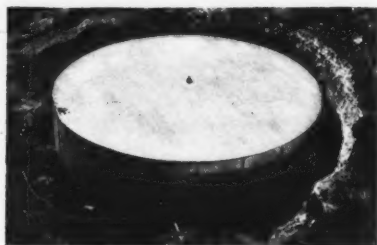
Alcoa Standard Tanks provide storage economies for a wide variety of chemicals.

STANDARD AND SPECIAL STORAGE TANKS

Alcoa Standard Storage Tanks are fabricated from 3003 alloy and are available in both horizontal and vertical types in sizes ranging from 5,800 to 21,400 gallons. Because they are made with stocked components, they bring the user all the advantages of light, strong, corrosion-resistant Alcoa Aluminum at lower cost—with fast delivery.

Special storage tanks made of Alcoa sheet and plate can be constructed to meet specific requirements. Design and fabrication data will be furnished on request.

When you write, ask for Bulletin AD387, *Alcoa Standard Storage Tanks*.



World's largest all-aluminum tank stands 26 ft high, has a diameter of 128 ft, holds 2½ million gallons of 83% ammonium nitrate solution.

SHIPPING CONTAINERS

A wide variety of shipping containers conforming to ICC regulations is available from Alcoa. They range in size from 7½ to 110 gallons and are used to ship products ranging from beer to fuming nitric acid.

Lighter in weight than containers of other materials, Alcoa Aluminum containers are less expensive and give substantially longer service.

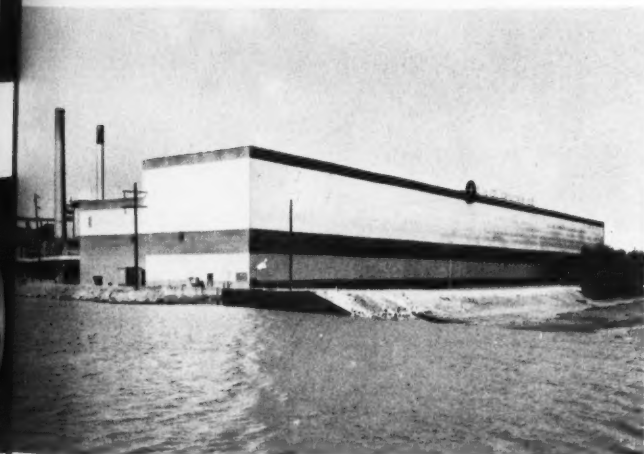
ROOFING, SIDING, STRUCTURALS & PAINT

Alcoa Industrial Building Products require practically no maintenance and serve well even when exposed to the corrosive atmospheres often encountered around processing areas. That explains the growing use of aluminum roofing and siding on plant buildings and outdoor equipment. Easily installed, it helps to keep construction costs low.

Alcoa also supplies structural shapes for use in construction where corrosion resistance and consequent low maintenance cost are advantageous.

Paints pigmented with Alcoa Aluminum provide a continuous metallic sheet of pure aluminum for unmatched protective power. Where both color and protection are desired, Alcoa supplies nonleafing pigments to paint formulators.

Write for *Alcoa Industrial Building Products* booklet, AD285, *Alcoa Sandwich Walls* booklet, AD625, or *Painting with Aluminum* booklet, AD228.



Aluminum exterior surfaces for buildings and conveyors provide pleasing appearance with minimum maintenance.

ALUMINUM COMPANY OF AMERICA

Alcoa Building, Pittsburgh 19, Pennsylvania

**SPECIFICATION: Process Equipment;
Plant Structures; Transfer and Storage
Equipment . . . shall be Alcoa Aluminum
to resist corrosion**

NEW ALCOA EXPAND- ABLE TUBE-IN-SHEET

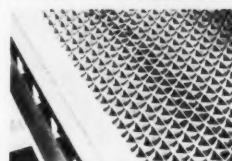
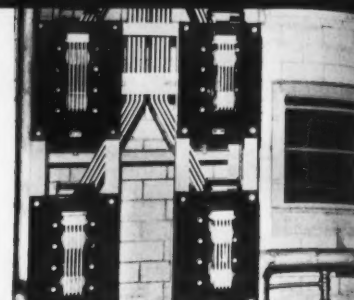
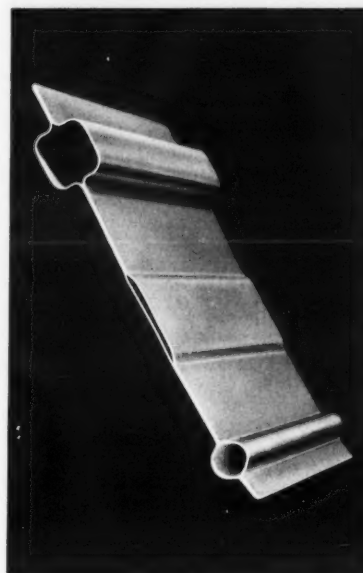
Here's a brand new way to bring the outstanding corrosion resistance of Alcoa Aluminum to heat transfer operations. It's Alcoa Expandable Tube-in-Sheet. To produce it, Alcoa has perfected and greatly amplified a revolutionary process for creating tubular shapes as an integral part of aluminum sheet and plate.

These unique, one-piece units of aluminum sheet or plate contain a series of lengthwise, parallel areas that can be expanded hydraulically or with air to form integral tubes in a variety of shapes. Without complicated joining or fabricating, the product is ideally suited to solving heating and cooling problems found in many industrial processes.

Expandable Tube Sheet is available in all nonheat-treatable alloys and in heat-treatable alloys 6061, 2024 and 7075. It is shipped unexpanded in mill finish coiled or flat sheet. Get full information today.

BUS BARS

Excellent corrosion resistance, added to lowest cost per unit of current carrying capacity, makes aluminum ideal for bus bar use in process plants. Get complete information by writing for the Alcoa Bus Conductor Handbook, AD661.



GRATING, STAIR TREADS AND TREAD PLATE

Corrosion-resistant grating-type Alcoa Aluminum stair treads need no paint. They are available in all standard sizes at a price competitive with galvanized steel with abrasive nosing. (Write for Bulletin AD679.)

Aluminum grating is used widely for floors and walkways in and around processing plants because of its light weight, resistance to corrosion, low maintenance and non-sparking characteristics.

Alcoa supplies both a standard aluminum tread plate and Alcoa Abrasive Tread Plate. The latter has a self-renewing, bonded abrasive surface for extra nonskid protection. Write for Bulletin AD596.

ALCOA ENGINEERS WILL HELP YOU WIN THE FIGHT AGAINST CORROSION!

For over 40 years, Alcoa has worked with all segments of the process industries to develop a tremendous variety of applications in which aluminum can be used successfully to resist corrosion. That effort has resulted in an immense fund of practical nonconfidential information covering corrosion characteristics of many materials and processes under a variety of conditions. You can obtain this information without cost or obligation simply by writing Alcoa at the address given below.

When writing, state your requirements as specifically as possible . . . so that Alcoa's development engineers may supply you with the best data.

Write today! Join the thousands who have found Alcoa Aluminum their most important ally in the constant battle against the high cost of corrosion in the process industries.

Aluminum Company of America
902-K Alcoa Building, Pittsburgh 19, Pa.
Please send me the following literature
(see above for booklet nos.):

Name _____
Company _____ Title _____
Address _____
City _____ Zone _____ State _____



ALCOA THEATRE
Fine Entertainment
ALTERNATE MONDAY EVENINGS



**THIS
FREE
BOOK**

contains 80 pages of detailed data on the performance of aluminum in hundreds of applications throughout the process industries. It provides exact information on the behavior of aluminum with specific materials . . . along with complete design and specification information. Use it as your guide to the proper use of corrosion-resistant aluminum in your plants and equipment. When you write, ask for *Process Industries Book*, AD460.

Hexachlorophene in detergent builds up odor resistance of fabrics

Colgate-Palmolive Company is introducing a "new wash-day miracle, 'New Fab' detergent with Duratex." Already "Fab" is third largest selling detergent in the nation, and Colgate expects to capture an even bigger share of over-all market in coming months with "New Fab."

"Duratex," the company states, "promises to set up an odor-resisting barrier to help keep clothes deodorized, in addition to making them whiter and brighter. The barrier will be effective during wear and, most important, built up with each washing."

Two "Duratex" ingredients in the detergent are carboxymethyl cellulose (CMC) and hexachlorophene. Normally CMC is used in laundry detergents in concentrations of 0.3 to 0.5%. "New Fab" uses concentrations in range of 0.8 to 1.0%. CMC is compounded in normal crutching operation.

Hexachlorophene is used in concentrations in range of 0.15 to 0.20%. In this concentration, optimum effectiveness is obtained after a build-up in fabric resulting from four to five consecutive launderings.

One lb of the detergent contains about 0.4 cents of CMC and an equal value of hexachlorophene. Although normal equipment is used in manufacturing operation, special evaluation techniques and bacteriological tests are required to analyze finished detergent in order to determine effectiveness of the germicide.

(CMC is supplied by E. I. du Pont de Nemours & Co. (Inc.), Hercules Powder Co., and Wyandotte Chemicals Corp.)

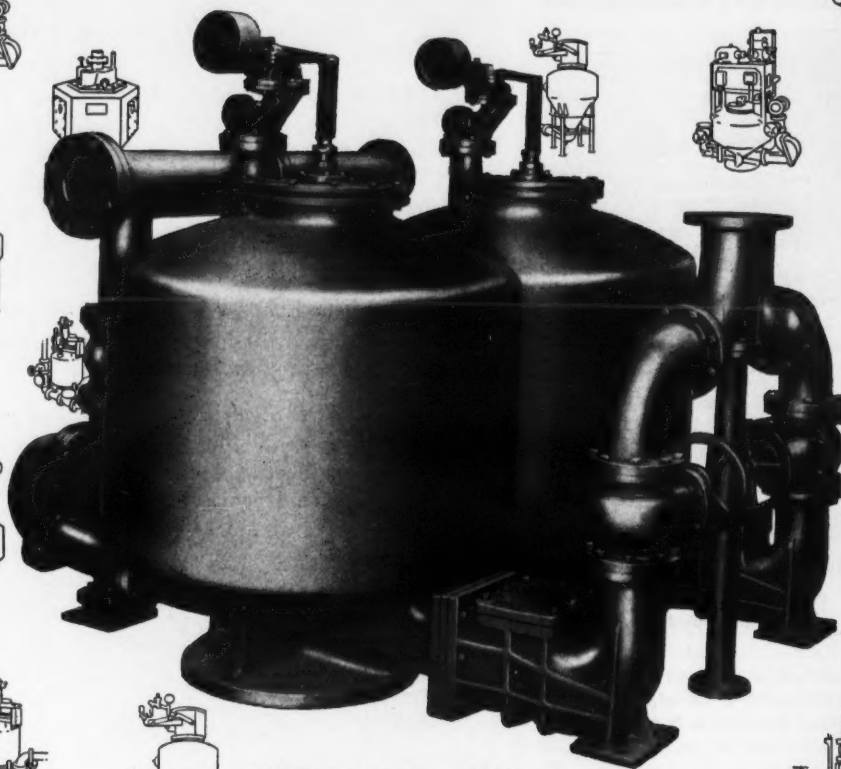
(Hexachlorophene is supplied by Sindar Corporation, a subsidiary of Givaudan-Delawanna, Inc., 330 W. 42nd St., New York 36, N.Y.)

Check 1786 opposite last page.

For more information on product at left, specify 1787 . . . see information request blank opposite last page.

there are NO "GUINEA PIGS" among Yeomans Pneumatic Ejectors

all 212 SIZES and TYPES are JOB PROVED!



Above is a duplex Shone® with mechanical controls—the original pneumatic ejector. The first Shone was installed in 1870. Other Yeomans pneumatic ejectors are: Expelsor®, Packex®, Pneu-Pump, Transporter, and SS Screenings Unit.

There's no risk involved when you specify a Yeomans pneumatic ejector. Chances are your client already knows that it's the most dependable unit he can get . . . and you are able to show him why. Yeomans pneumatic ejectors have exclusive features that can mean the difference between a troublesome 10-year life, and a 25 to 50-year span which is almost maintenance free. In the Yeomans line, also, you can give your client the exact pneumatic ejector required . . . not an "almost model." On your next job, call in a Yeomans representative to show you the difference. He has a slide film which does the job quickly and thoroughly. For your convenience, also, information on Yeomans pneumatic ejectors is carried in Sweet's Catalog.

Ad number E-5801

YEOMANS



2003-5 N. Ruby St., Melrose Park, Ill.

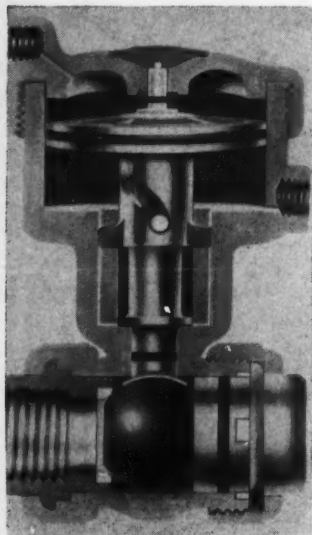
WORLD'S LARGEST AND BEST LINE OF PNEUMATIC EJECTORS

Check 1788 opposite last page

**Valve operator available
in variety of plastics**

Can be used with plastic
piping systems

Recently announced valve
operator can be furnished in
polyvinyl chloride, Kralastic,
as well as Penton and Pro-
fax. Unit is ideal for use with
plastic piping systems carrying



Plastic valve operator can be
easily disassembled for cleaning

corrosives. It can be built to
withstand a variety of corro-
sives at temperatures to 300°F.
Valve weighs only about 1/10
that of a metal unit.

(Plastic valve operator is
product of Chemtrol, Div. of
Tapered Air Products, 10890
Stanford Ave., Lynwood,
California.)

Check 1789 opposite last page.

**Moisture doesn't hurt
open motor protected
by silicone, epoxy**

Units withstand conditions
formerly requiring TEFC

Uses: Motors are designed
for areas where chemicals,
oily vapors, or moisture
would otherwise limit service
life of all but totally en-
closed or weather-protected
units.

Holiday destination

Saturday problem:

Damaged 8,000 gallon reactor

Sunday job: Trouble-shoot and repair

Monday result: Reactor back "on-stream"

It's nine Saturday night. Home phone rings long distance.
It's a Texas customer's voice: "One of our 8,000 gallon
reactors was damaged. How soon can you fix it?" Answer:
"Trouble-shooter leaving earliest flight." Glascote service
engineer packs. Takes-off 7 a.m. Sunday. Repairs completed
10:30 that night. Monday — and he's up early. Repairs
inspected. Reactor started up and back "on-stream."

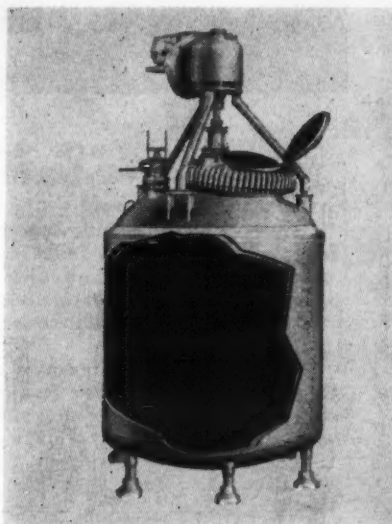
Case in point: Every Glascote customer is automatically
enrolled in our life-long preventive maintenance and flight-
fast service programs!

Our objective: *Protecting profitability of your Glascote glass-
lined equipment.* This basic protection program includes
process engineering and consulting help, in-plant seminars
and specialized field service.



**What's behind the Glascote sales engineer
...and his glass-lined products?**

He's an experienced engineer who can
give you on-the-spot product and process
assistance. And behind him—38 years of
Glascote experience in manufacturing
glass-lined vessels and tanks for the pro-
cess industries. Through continual research
and development engineering, Glascote
stays ahead of the demand for new and im-
proved processes requiring a wider range
of corrosion, temperature and thermal
shock-resisting properties for glass linings.



**Custom and Standard
Reactors**—Designs include
the HR (Heavy-duty closed),
CR (clamp-top), SR (standard
closed) and the new spheri-
cal reactor. Capacities range
from 300 to 8,000 gallons
dependent on design.

Glascote®

PRODUCTS, INC.

CLEVELAND 17, OHIO

Sales offices or agents in principal cities. Export sales:
A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.

A SUBSIDIARY OF A. O. Smith CORPORATION

World's largest manufacturer of glass-protected steel products



- a customer's plant



Check 1790 opposite last page

Features Epoxy-resin and silicone rubber are used to protect field coils and stator coils. This gives open-type motors resistance to unusual service conditions formerly obtainable only with expensive enclosures.

Description: Super-Seal line of motors is available in sizes from one hp at 220 volts to



Running in a 4% saline solution while fully loaded, open motor demonstrates excellent resistance of windings to chemical or moisture attack

5500 hp at 4160 volts including synchronous units.

Silicone rubber insulation for coil windings is vulcanized into a solid dielectric wall without joints, voids, or breaks. It is unaffected by humid conditions. Epoxy encapsulated stators are equally well sealed.

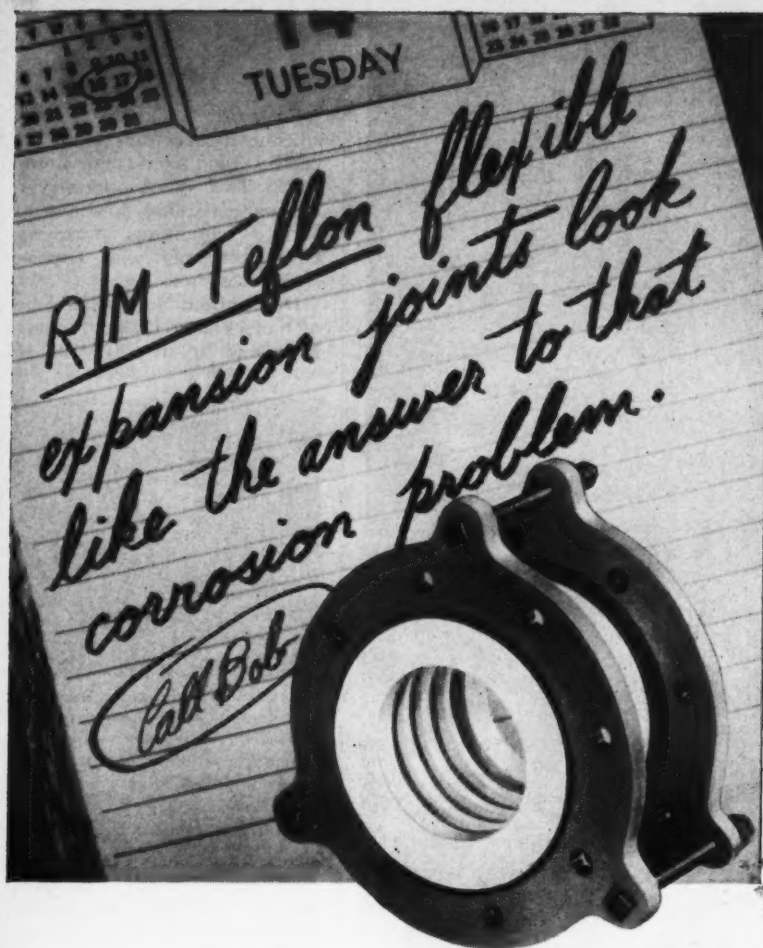
Savings up to 60% are obtainable relative to totally enclosed, fan-cooled motors. A 35% savings can be expected over cost of weather-protected enclosures. Maintenance, when needed, is easier and less costly. The open frames are fully accessible.

(Super-Seal motors are a product of Allis-Chalmers Manufacturing Company, Post Office Box 512, Milwaukee 1, Wisconsin.)

Check 1791 opposite last page.

Nickel-iron valves, alloy trimmed for corrosive service, are included in 28-page condensed catalog. Wide variety of other types is described and shown. Valve comparison chart gives quick cross reference to figure numbers of valves of ten different manufacturers. Bul CD-2 — The Ohio Injector Company, Wadsworth, Ohio

Check 1792 opposite last page.



Chemical-handling accessories, made of "Teflon"® by Raybestos-Manhattan, are the answer to many of your more difficult problems.

"Teflon" shows no reaction to chemicals—except for fluorine gas and chlorine trifluoride, both at high temperatures, and molten alkali metals. Impervious to all known industrial acids and caustics. Can be kept in continuous service in a wide temperature range.

Another valuable plus for you: R/M's strict quality control and pre-

cision workmanship. You can depend on R/M "Teflon" products: solid and envelope gaskets, sheets, rods, tube, tape, expansion joints, flexible couplings, stuffing box and valve stem packings, Vee-Flex packings, solid and braided packings.

R/M's engineers have amassed a wealth of experience in manufacturing packings and gasket materials to meet the most exacting requirements of the chemical industry. This experience is at your disposal any time—write R/M Packing Division.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex,® Vee-Square,® Universal Plastic and "versi-pak"®; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR. *A Du Pont trademark

R
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PACKINGS

RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings
Brake Blocks • Clutch Facings • Industrial Adhesives • Bowling Balls • Laundry Pads and Covers

Check 1793 opposite last page

IDEAS



Secretaries for engineers trained as specialists

Two-year course prepares grads to take over routine duties

Instead of being just short-hand experts, graduates of a course at Business Training College, Pittsburgh, Pa., learn what the engineer's tools are, how he uses them, and how to spell them without looking them up in a technical dictionary.

Purpose of the course is two-fold: 1) Train secretaries for engineers; 2) Teach them to be engineering aides as well, so that they can relieve the engineer of many routine duties and permit him to spend his time on more important work.

In the planning stage for several years, the first class in

the two-year course started only a few years ago. Indicating the definite demand for this type of secretary, the school was swamped with inquiries from engineers as to how soon the graduates of the first class would be available for employment.

Through a series of challenging courses, graduates are well-prepared to assume their new duties. They have seen or actually conducted experiments in inorganic chemical analysis, electrochemical changes, magnetism, electrolytic cells, sonic vibrations, cloud chambers, extraction of metals from ores, etc.

Experiments in inorganic chemistry are designed to familiarize students with the elements and their compounds, and give them a better understanding of the laboratory



Future engineering aides learn what is involved in step-by-step scientific procedures, in addition to acquiring specialized secretarial skills

Students make field trips to industrial plants, radio and radar installations, and sit in on science conventions.

Actual materials from engineering firms are used in the shorthand and typing classes, and the secretaries are trained to use slide rules and mathematical equations. They are also taught to read blueprints. Along with these "bread and butter" courses comes training in personality development and "charm" that makes the secretaries an asset to any office.

This special secretary training in the engineering field is said to be the first course of its kind in the nation. It is rapidly expanding its program and facilities to take care of the many new applicants for the course and to fill the big demand for the services of its graduates.

(Further information on engineering secretarial course may be obtained from Business Training College, Wood St. and Blvd. of the Allies, Pittsburgh, Pa.)

Check 1794 opposite last page.



Help Yourself to useful data on UPVC PIPING

These authoritative bulletins provide valuable reference data on ttp products—where and how to use them in the fight against corrosion. Check coupon and mail.

- 1 **LIGHT WEIGHT FITTINGS.** How they cut your costs. Includes dimensions of all types and sizes to 4".
- 2 **CORROSION RESISTANCE CHART.** Compares corrosion-resisting piping materials for handling all chemicals.
- 3 **PVC PIPE FITTINGS, FLANGES and VALVES.** A comprehensive data book on these piping products... applications... advantages... properties... installation procedures... operating pressures.
- 4 **UPVC LINED PIPING SYSTEMS.** Describes fittings, flanges, pipe of metal systems with UPVC lining for corrosive fluids with increased pressure-temperature limits.

Leading Manufacturer of Injection Molded Unplasticized Polyvinyl Chloride Pipe Fittings, Flanges and Valves.

TUBE TURNS PLASTICS, INC.

2929 Magazine Street • Louisville 11, Kentucky

- 5 **DIAPHRAGM VALVES.** Features, applications, dimensions of this line of Grinnell-Saunders UPVC diaphragm valves.
- 6 **PLUG VALVES.** Application and advantages of self-lubricated UPVC plug valves.
- 7 **LIFT CHECK VALVES.** Key to long, trouble-free service. Describes. Gives dimensions.
- 8 **SOLVENT CEMENT.** Tells how to use to simplify installation of UPVC piping.
- 9 **THREAD LUBRICANT.** How to use to speed assembly of threaded joints.

TUBE TURNS PLASTICS, INC., Dept. CP-10
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Send free reference material indicated by numbers I have checked.

1 2 3 4 5 6 7 8 9

Company Name _____

Company Address _____

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Your Name _____

Position _____

Check 1795 opposite last page

at Shell Chemical TELSTOR® Continuously Monitors the Process

Copolymerization of synthetic rubber's basic ingredients—butadiene and styrene, requires stable, reliable measurement, indication and control. A Telstor Continuous Level Indication System, developed by Robertshaw, monitors flash tanks in these critical blending areas at Shell Chemical Corporation's giant Torrance, Calif. latex plant. Nearby, Robertshaw Series 42 instrumentation provides panel indication, recordation and control.

Endlessly, everywhere in the process industry, trouble-free Robertshaw Capacitance Measurement and Control Systems are contributing toward reduction of operating expenses and increased product quality. Write for "Capacitance Level Measurement and Control Systems", a new, 8-page, illustrated discussion of this important subject.

Field Offices and Sales Representatives in Principal Cities.

AERONAUTICAL AND INSTRUMENT DIVISION

Robertshaw-Fulton CONTROLS COMPANY

SANTA ANA FREEWAY AT EUCLID AVENUE • ANAHEIM, CALIFORNIA

Check 1796 opposite last page

IDEAS

Catgut sutures sterilized in matter of seconds by linear accelerator

Electron beam radiation is being used to sterilize surgical sutures on a full-scale commercial basis at Ethicon, Inc., a division of Johnson and Johnson, Somerville, New Jersey. In a matter of seconds, the catgut sutures are free from all contamination, packed, and ready for shipment.

Sealed tubes containing the sutures are bombarded by electrons from a 7-million-volt linear accelerator, having a 4.2 kw power output. Dosage is about 3.0 million reps (roentgen equivalent, physical). Five to ten dozen sutures are sterilized per minute.

Up to now, sutures were sterilized by conventional heat methods. This was not only time-consuming, but also involved complicated handling problems. Sterilizing them in sealed tubes greatly simplifies all this and also results in 8 to 14 percent stronger sutures, than those processed conventionally.

(Linear accelerator was designed by High Voltage Engineering Corporation, Burlington, Massachusetts.)

Check 1797 opposite last page.

Electrode ups efficiency of electro-precipitator

Controls corona discharge on energizing electrodes

An electrode that improves the efficiency of electrostatic precipitators has been developed. Resembling conventional barbed wire, device successfully controls corona discharge on the energizing electrodes — a problem that has plagued precipitator manufacturers for almost 50 years.

Big problem in the past was to prevent build-up of collected material on the electrodes, which provide negative charge to dust particles. Even though rapping at frequent intervals helped, it did not stop uneven accumulations of dust. Resulting insulating effect produced unre-



... in dry
dust control

HIGH EFFICIENCY DUCLONES®

assure maximum recovery
at lowest cost

DUCLONES—Ducon high efficiency cyclones—are designed and constructed for high recovery efficiency and low gas resistance. Their sturdy construction assures long, continuous service with a minimum of maintenance.

The exceptional performance of Ducclone collectors is the result of these 6 unique features:

1. Small Diameter produces high efficiency
2. Helical Roof provides a turbulence-free path for the entering gas stream
3. Steep Cone improves dust separation
4. Dust Trap assures efficient dust removal from the cone
5. Vortex Shield prevents re-entrainment of dust in upward gas vortex
6. Scroll Outlet provides a low resistance clean gas outlet

send for Bulletin C-958.

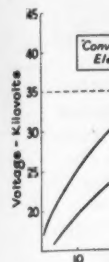


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name in
DUST
CONTROL

**THE
Ducon** COMPANY, INC.
147 EAST SECOND STREET • MINNEOLA, L. I., NEW YORK

Check 1798 opposite last page
CHEMICAL PROCESSING

dictable and
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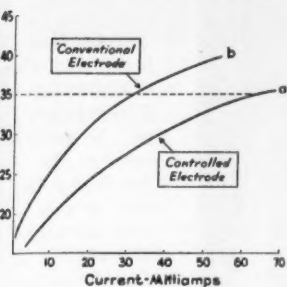
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paying
Pont pa
revealed
appearin
Solution

OCTO

IDEAS

ectable and uncontrolled pattern in the corona discharge, which is key factor in dust removal action.

Suspended vertically between precipitator's collecting plates, the barbed-wire electrode replaces the conventional straight-wire energizer.



At 35,000 volts input, barbed electrode delivers about 70 milliamps compared to 35 milliamps for the conventional electrode

ests have proven that whatever insulating material may build up on the main wire, the barb points remain clean. The corona discharge occurs and remains constant at these points.

By proper spacing of the barbs, complete control of the corona discharge is achieved throughout the precipitator. Efficiency ratio (amount of current produced in electrodes for given quantity of input power) is greatly increased. Existing precipitators using the electrodes operate appreciably beyond their original design capacity. New precipitators can be made considerably smaller, for given dust load and gas volume, than units equipped with conventional electrodes.

Electrode was developed by Metal Products Division of Hoppers Company, Inc., 200 Pratt St., Baltimore 3, Md. Check 1799 opposite last page.

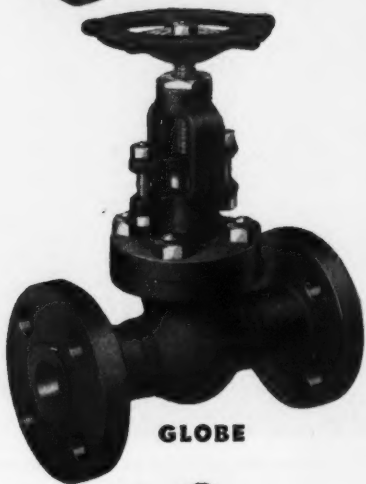
NEXT MONTH

Noiseless, vibration-free dispersion mills that use ordinary sand and as grinding media, are paying big dividends in Du Pont paint plants. Details are revealed in a feature article appearing in next month's New Solutions section.

Voegt



GATE



GLOBE



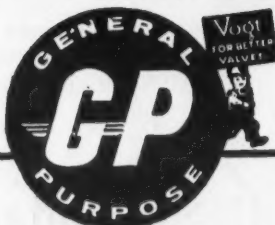
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Gate, Globe
and Check
VALVES

ASA Standard Design
Spiral wound body design
Stainless steel lined construction
Light weight with maximum strength
Complete line—pressure ratings to 1500 psi

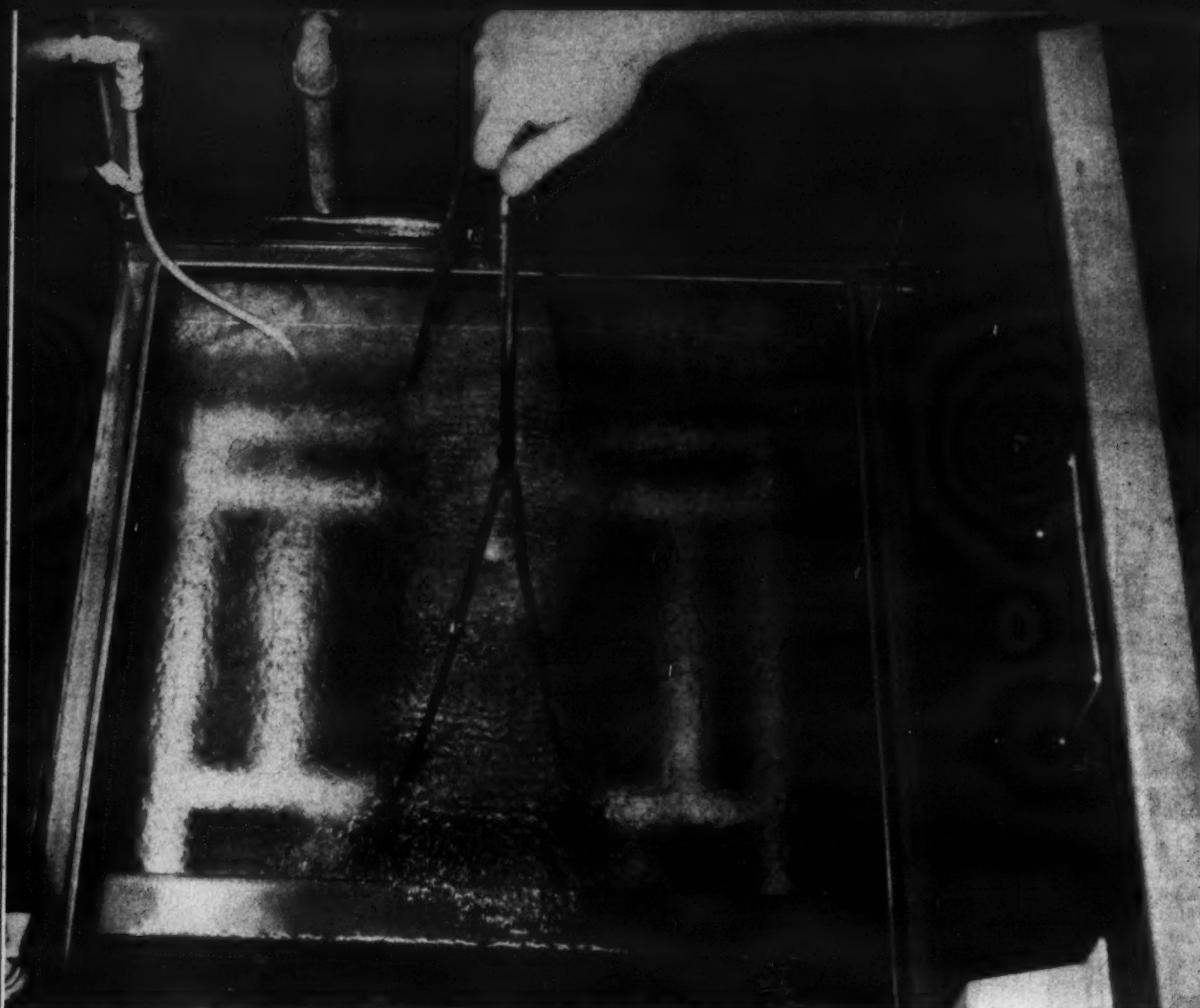
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FORGED STEEL
VALVES

HENRY VOGT MACHINE CO., BOX 1918, LOUISVILLE 1, KY.
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N.J.
St. Louis, Charleston, W. Va., Cincinnati

Check 1800 opposite last page



This unit cleans machine parts with solvents and ultrasonic waves. The walls are made from Stainless Steel because Stainless resists corrosion and will not contaminate the parts being cleaned.

Only Stainless Steel can stand high-frequency vibrations in cleaning units

The Detrex Chemical Industries, Inc. of Detroit has developed a method of cleaning machine parts with 10-second exposures to ultrasonic waves in vats of trichlorethylene.

Stainless Steel is the only metal that can be used in these vats. They tried others but found that in time the ultrasonic waves shook loose tiny specks of corroded metal from the vat walls and dropped them on the cleaned machine part.

With Stainless Steel vats there are no tiny specks of corrosion. The Stainless takes these high-frequency vibrations every day and it doesn't even show a pin-point spot in its hard, smooth finish.

When you buy new equipment for your plant, think about corrosion-resistant Stainless Steel. If you want service-tested quality, specify USS Stainless Steel.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Warehouse Distributors
United States Steel Export Company



United States Steel

THAT'S INTERESTING

Pie in sky?

American Can Company has started filling 3000 aluminum squeeze tubes with liquid and semi-solid foods developed by US Army Quartermaster Food and Container Institute. Filled tubes will be turned over to the Air Force for tests at extremely high altitudes. Tubes don't rely on gravity and are not affected by pressure differences inside and outside helmet. Pilot squeezes tube and food is forced up through helmet into mouth. Tube weighs only 9 grams. Menu so far includes such items as flavored milks, fruit juices, chicken, beef, and ham.

Alloy fittings packaged

Individual packaging of stainless steel and non-ferrous welding fittings and flanges has been adopted by Tube Turns division of Chemetron Corp. Every fitting in sizes up to 12" and all flanges up to 8" will be packed in sleeve type cardboard cylinder.



Particle size analyzers . . .

. . . may be used separately or together. Recently developed, the twin analyzers are designed to determine "effective size" — the size of particle clusters as they emerge from a stack or exist in the atmosphere — in terms of their rate of settling.

The continuous gravity chamber (right) can collect particle sizes from 2 to 50 microns and show proportion of various sized particles. Centrifugal analyzer (left) will measure particles down to 0.1 micron.

(Particle size analyzers are development of Stanford Research Institute, Menlo Park, California.)

Chemical cross-linking of polyethylene, carbon black

Products may be available soon in commercial quantities

An economical plastic material, made by cross-linking polyethylene and carbon black, may soon be available in commercial quantities. Product has qualities that permit it to be used efficiently for insulating and jacketing wire and cable, forming pipe and tube, and for compression and transfer molded products.

Still in the experimental stage, the cross-linking procedure is being developed jointly by Hercules Powder Company and Godfrey L. Cabot, Inc. Key ingredients which make the chemical

cross-linking possible are dicumyl peroxide and thermal carbon black.

Advantages of the new plastic materials, formed as a result of this cross-linking, are improved strength, resistance to heat, and reduced environmental stress cracking. Products are also resistant to weather, solvents, and surface-active agents.

All of these advantages are obtained with practically no sacrifice in the inherently low-temperature properties of polyethylene. Results indicate that with high-density polyethylene, instead of conventional polyethylene, the materials will have even greater strength and heat resistance, as well as the other advantages gained through chemical cross-linking.

(Information courtesy of Hercules Powder Company, Wilmington 99, Delaware.)

Ammonium fluoride used to remove zirconium from fuel elements

Method has been developed for chemically removing zirconium jackets from spent nuclear reactor fuel elements without harming the processing equipment.

Process involves dissolving the fuel jackets in a boiling solution of ammonium fluoride. Although it isn't entirely harmless to the process vessels, ammonium fluoride dissolves zirconium 150,000 times as fast as it does stainless steel. By carefully regulating strength of solution, operators can make it nearly harmless to the vessel by time zirconium jackets have disappeared.

The solution also dissolves small amounts of uranium and plutonium. By diluting and then chilling solution after zirconium jackets have been removed, two-thirds of uranium and much of the plutonium can be made to settle out and can be recovered.

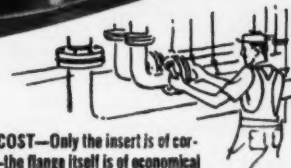
(Process was developed at General Electric's Hanford Atomic Products Operation, Richland, Washington.)

BE POSITIVE SPECIFY SIFCO STAINLESS INSERT FLANGES

- POSITIVE SAVINGS •
- POSITIVE SEALING •
- POSITIVE IDENTIFICATION •
- POSITIVE BOLT HOLE ALIGNMENT •

You're certain of the right corrosion resistant insert flanges for coupling your process piping when you specify "SIFCO". Each SIFCO insert is permanently identified for manufacturer, pipe size, pressure, grade and heat code; each carbon steel flange is similarly identified to assure positive identification.

Other familiar and dependable SIFCO advantages are:



- **LOW ORIGINAL COST**—Only the insert is of corrosion resistant alloy—the flange itself is of economical carbon steel.
- **MAXIMUM SEALING**—Leakproof joints are assured by true concentric grooves on the gasket face.
- **FASTER BOLT HOLE ALIGNMENT**—Only SIFCO flanges can be rotated easily into position after inserts have been welded, threaded, or rolled to pipes or fittings . . . exclusive SIFCO feature eliminates bolt hole alignment problems.

There are many sizes of SIFCO stainless steel insert flanges—all identified by number and code—in these 4 styles:

SLIP-ON—offers the most economical flange for welding to pipe or fitting.

ROLL-ON—for use where welding, van stoning or threading is not desirable. Can be assembled by a simple expanding method.

SOCKET TYPE—provides ideal welding features to insure leakproof joints.

THREAD-ON—assures tighter threaded connection and can eliminate back welding, achieving bolt hole alignment without loosening thread.

Write, wire or call for full details and catalog or see your local distributor.

STAINLESS INSERT FLANGE CO.
6526 UPLAND STREET, PHILADELPHIA 42, PA.
TELEPHONE: SARatoga 6-8850

Check 1801 opposite last page

Stretch maintenance dollars...



by *Repairing* corroded concrete with **NEW Penntrowel** **SURFACING COMPOUNDS**

Next time you're faced with badly corroded concrete, brick or cement surfaces in your plant, call for PENNTROWEL corrosion-proof surfacing instead of a jack-hammer crew.

Unmatched chemical resistance and toughness. PENNTROWEL packs triple power... combines high chemical resistance, impermeability and inseparable bonding. It gives long, rugged service, with no cracking or sloughing off.

Fast, economical repair. You mix as much PENNTROWEL mortar as you need, right at the jobsite... then just trowel it on. It cures overnight, is ready for service the next day. And its cost is amazingly low!

PENNTROWEL corrosion-proof surfacings have been proved on the job in Pennsalt's own fluorine, chlorine and caustic plants. Three grades give top performance in any corrosion or wear application.



Corrosion Engineering Products Dept. 654
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Write Today
for PENNTROWEL folder CP-627
and installation cost data.



Check 1802 opposite last page

IDEAS

**Fast heat, evenly applied
produces top-grade
building material**

Efficient, 8-zone oven helps
turn out warp-free product

Final specifications for building board call for uniform strength and texture, and extreme flatness. Achieving this, however, is no simple task. Process requires specialized equipment and must be carefully controlled to avoid warpage to product.

One of the more recently introduced materials is called "Tectum", a light-weight, non-combustible, sound-dead-



Mat is dried in 8-zone, 160-ft long oven. Each zone has its own heater and auxiliary equipment. Two of zones are shown above

ening board. Product is finding widespread use as roof decking, wall partitions, and ceilings.

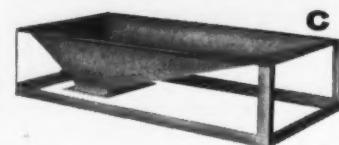
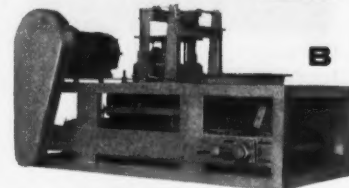
Manufacturing is conducted on a continuous line 387 ft long. Process starts with wood fiber being formed into a matting. This is then pressed with a bonding material into a continuous mat ribbon 8 ft wide and in several standard thicknesses, ranging from 1 to 3 inches.

The matted excelsior is passed through a continuous press between 2 rigidly held belts. Heat and pressure at this point sets mat into a semi-rigid continuous board. From the press, mat is passed through a silicate of soda water-proofing slurry before entering multi-zoned, high-velocity, convection oven, which is key unit in process.

Oven has 8 separate zones heated at different temperatures. Zones are connected to-

UNITIZED WEIGHER-FEEDER

**Building-block
design gives
custom-made
utility at an off-
the-shelf cost**



UNITIZED construction makes the W-C Weigher-Feeder readily adaptable to practically any processing setup. Components are standardized, proven and interchangeable... pre-engineered with virtual "plug-in" simplicity.

A The UPPER FRAME controls material input, is supplied with a rotary feeder, sliding gate, vibratory feeder or other mechanism matched to material and flow requirements.

B The CONVEYOR FRAME, where material is weighed, includes a complete conveyor section, weighing pan and transmitter with integral tare adjustment. W-C's system of flexure mountings assures accurate measurement despite uneven loading or pile-ups. There are no knife-edges, beam pivots or other points of concentrated wear to affect accuracy.

C The LOWER FRAME is optional; can be a simple chute as shown.

In addition, the W-C Weigher-Feeder is designed to handle such instrument-controlled functions as flow totalizing, recording, programming, and material proportioning. Units are also available for installation on existing conveyors.

Complete information is given
in Catalog 12. Write for a copy



WEIGHING and Control COMPONENTS, Inc.
206-A Lincoln Ave., Hattboro, Pa.

Check 1803 opposite last page
CHEMICAL PROCESSING

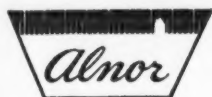
READ

any surface temperature
with **Alnor** PYROCON

Equipment...material...metallic or non-metallic...flat, curved... revolving or stationary—you can read every surface temperature accurately in less than 3 seconds!

Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

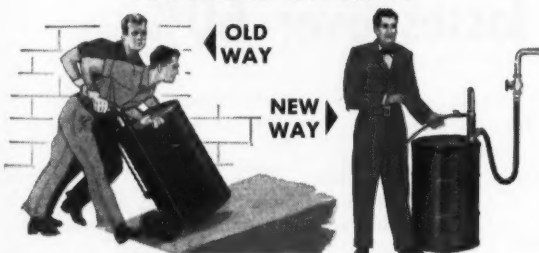
Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



**PRECISION INSTRUMENTS
FOR EVERY INDUSTRY**

Check 1804 opposite last page

"Move the Contents" Not the Drum!



Transport your liquids (or semi-liquids) to point of use through inexpensive piping with a Graco "Direct-From-Drum" pump and show tremendous savings by cutting unnecessary plant traffic.

The modern way is to transport your liquids or fluids from receiving room to point of use through a simple pipe line. Air-powered, reciprocating pumps run

only when valve at delivery point is opened. No expensive electrical wiring required. This lightweight drum pump fits any standard 2 inch bung opening.

Some plants handle up to 25 different fluids this Graco way—and cut in-and-out traffic of full and empty drums. Investigate today how similar savings can be made in your plant.

GRACO air-operated "DIRECT-FROM-DRUM" PUMPS

WRITE FOR
SAMPLE DRAWING
OF TYPICAL
SET-UP.



GRAY COMPANY, INC.
102 Graco Square
Minneapolis 13, Minnesota

FACTORY BRANCHES: New York (Long Island City) • Philadelphia
Detroit • Chicago • Atlanta • Houston • San Francisco
SALES OFFICES: Washington • Toronto

Check 1805 opposite last page

IDEAS

gether with special seals to form line 160 ft long and 8 ft wide. One zone is 34 ft long, one is 30 ft, and remaining 6 are 16 ft.

Each zone has its own 1,765,000 Btu/hr heater. Two 3300-cfm blowers provide combustion air for all of the burners. One supplies the 2 larger sections and the other the 6 smaller sections. Each zone also has its own control equipment. Oven's first zone is kept at 132°F. Highest temperature is in last section, which is held at 300°F.

Each zone has its own recirculating fan to provide better uniformity of drying and to prevent warpage. Fan blows air down through mat in one section and another fan blows air up through mat in next section. This repeats alternately through whole line.

Rollers in oven are designed to prevent physical distortion of mat from air pressure. Each zone is provided with a hot-air recirculating fan that develops pressure of 4½ in (wc) and supplies 20,000 to 25,000 cfm air to mat. Dampened exhaust opening is located between fan and heater for bleeding accumulated moisture from system. On suction side, dampened opening permits controlled entry of fresh air.

As mat leaves oven, edges are trimmed, and product is cut into standard panels. Some are finished at this stage, while others are coated with heavy asphalt paper as exterior finish or as base for "built-up" roofing.

(Oven and heating equipment was produced by Selas Corporation of America, Dresher, Pennsylvania.)

Check 1806 opposite last page.

(Further information about Tectum building board may be obtained from Tectum Corporation, Newark, Ohio.)

Check 1807 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

NEW!

DO-IT-YOURSELF THREE-DIMENSIONAL "DRAFTING"



Solve Process Plant Layout Problems Quickly, Economically with

"DESIGNING IN 3-D"

Now your own draftsmen can economically assemble complete plants or solve complex problems in scaled miniature. Scott Industries, a nationwide network of sales offices and model shops offers you one source of supply for all parts and materials. Scaled-to-size pipe, fittings, railings, fixtures... everything your own draftsmen need to execute plant layout in realistic miniature. Solve problems before they arise in production. Scott also offers you local custom model making if you need it. Either way you save money.

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INDUSTRIES, INC.

Dept. CP10, Olean, N. Y.

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Polystyrene, acetate, butyrate and polyethylene jars and vials for:
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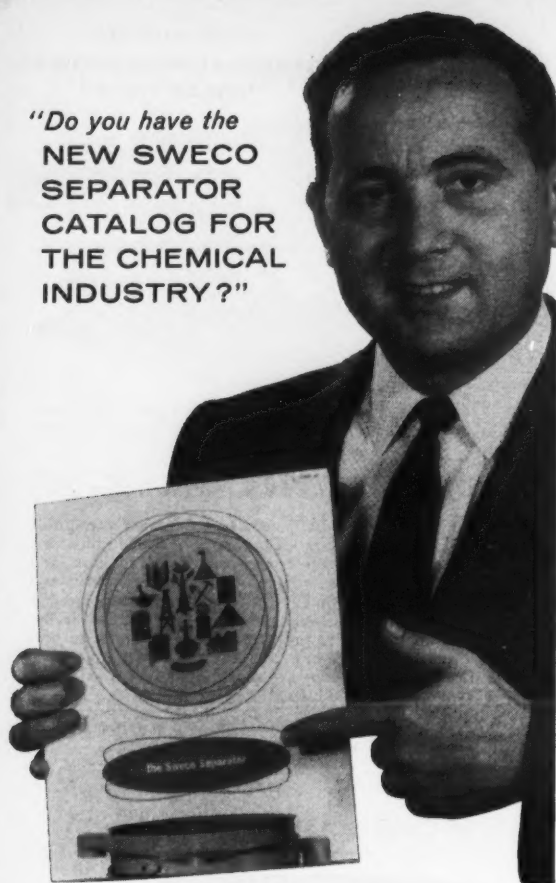
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Sales Office: Newark 5, New Jersey

Check 1809 opposite last page

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NEW SWECO
SEPARATOR
CATALOG FOR
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It tells how SWECO Vibrating Screen Separators save time and money in screening products like potash, salt, vinyl pellets, detergents, calcium hydroxide, catalysts, zirconium oxide, activated carbons, and other chemical products. Over 550 SWECO units are now in use in the chemical processing field.

Gives Specs and Screening Data

It shows pictures and describes 22 different models—including 18", 30" and 48" diameter units for high capacity and continuous operation. Also gives case studies and details about SWECO's application engineering and demonstration services.

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Department S-205-3

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Please send _____ new SWECO Separator Catalogs to:

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COMPANY _____ TITLE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



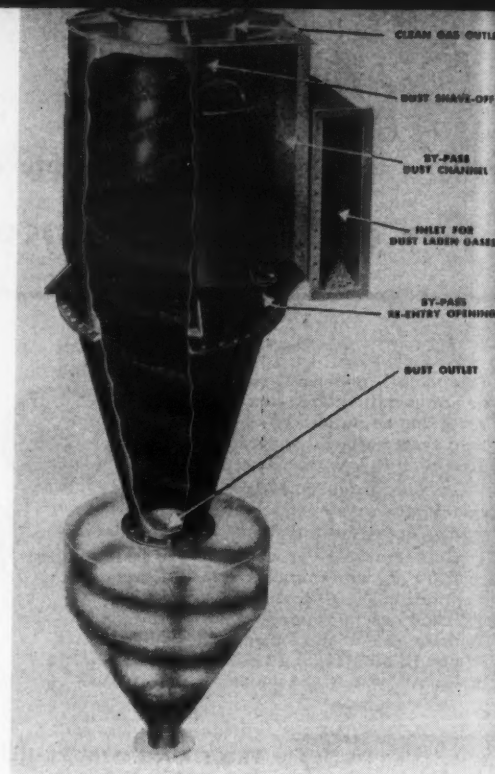
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PROCESSING EQUIPMENT

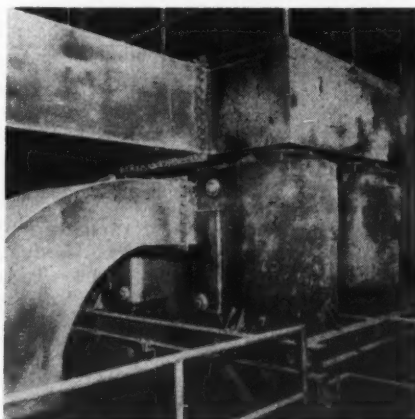
Collector has shave-off port which provides outlet for fines which accumulate in eddy currents prevailing near top of cyclone. Fines are delivered to cone, from which they empty into hopper below

Process equipment is difficult to design unless exact operating conditions are known. Here's a plant that started up and found that their dust collectors did not meet advance expectations. Faced with a serious dust emission problem, company installed efficient second-stage collectors that . . .



- Solve air pollution problem
- cut dust losses over 60%

TED F. MEINHOLD, Associate Editor
with F. A. RETZKE
Assistant Production Manager
Smith Agricultural Chemical Company



One of the second-stage dust collectors installed at Smith Agricultural Chemical Co. Gases enter through curved duct. Cleaned gases leave by way of horizontal duct at top

Problem: When Smith Agricultural Chemical Company started production of granular fertilizer at its Columbus, Ohio, plant, they discovered that dust collection equipment installed to clean the exhaust gases from the dryer and cooler used in the process was not adequate. Each unit was equipped with two cyclone collectors, but dust content of vented gases still exceeded city code limitations.

Gases from dryer's collector were found to contain 1.09 to 1.16 lb dust per 1000 lb gas. Those from the cooler's unit discharged 1.26 to 1.38 lb per 1000 lb gas. City officials prescribed that a reduction of emission of 0.4-0.5 lb per 1000 lb gas would be acceptable.

In planning the original installation, there was no precise previous data to go by. Expected conditions had to be estimated on basis of related experience. It was anticipated that the dryer would exhaust 18,000 cfm and the cooler 20,000 cfm. Actual dust analysis, of course, was not possible prior to plant operation.

Solution: Company called in manufacturer of dust collection equipment and asked them to make recommendations for bringing dust emission within code limitations. Dust was analyzed for particle size distribution so that proper collectors could be selected. Breakdown was as follows:

Particle Size, Microns	Dryer Collector Escape Dust, %	Cooler Collector Escape Dust, %
over 45	1.65	0.70
40-45	0.05	0.03
35-40	0.09	0.04
30-35	0.18	0.09
25-30	0.43	0.19
20-25	0.60	0.37
15-20	1.60	0.88
10-15	4.40	2.30
5-10	18.10	11.30
under 5	72.90	84.10
	100.00	100.00

In conducting these tests it was also found that the volume of gas handled by dryer and cooler was almost the reverse of what was originally anticipated. Dryer collectors handled some 20,000 cfm and cooler collectors about 18,000 cfm.

After studying these data, it was recommended that existing collectors be reversed and that they be supplemented with second-stage units consisting of four cyclones each. An alternate solution would be to replace existing units with higher efficiency equipment. However, this alternative resulted in a theoretical dust removal capacity too close for comfort to code allowance. Therefore, the second-stage units were decided upon.

In the new collectors, gases enter cyclones tangentially from a split-duct manifold without loss of pressure due to change of direction. Within cyclones, solids are thrown by centrifugal force to cyclone wall. Due to airflow pattern, which is a descending helix at the cylinder periphery, dust is carried downward and discharged to conical outlets into hopper below. Cleaned gas ascends in helical manner at center of cyclone and leaves through outlet pipe which ex-

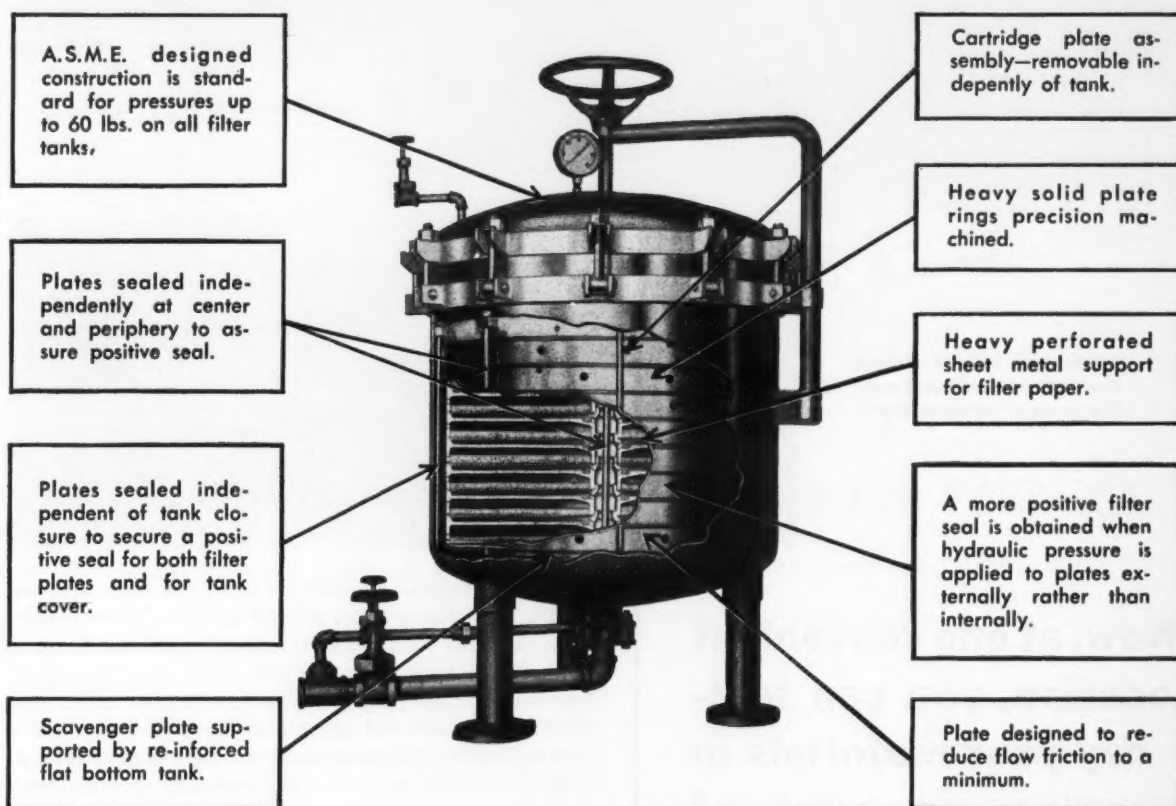


Undisputed First Choice

with engineers who have had occasion to thoroughly test this type of filter. Shown here are structural features that are the result of over 30 years experience in building this one filter.



Aloysius C. Kracklauer
Originator of the Horizontal Plate Filter

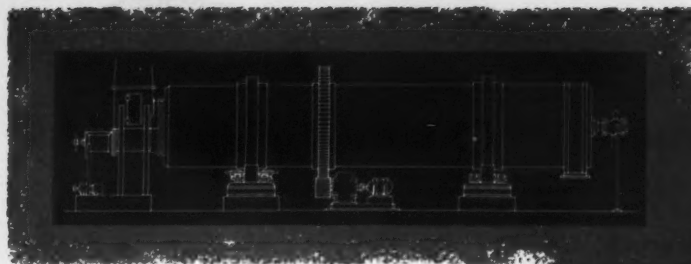


The Sparkler, original exclusive horizontal plate design and flow principle, has never been equalled for efficiency and dependability in filtering with any and all types of filter aids. The cake maintains its original position as formed regardless of pressure fluctuation flow rate or viscosity. No break-through is possible, even with a complete shut down of the filter. Filtering can be resumed with perfect safety at any time. With Sparkler plate construction a completely sanitary filter can be furnished.

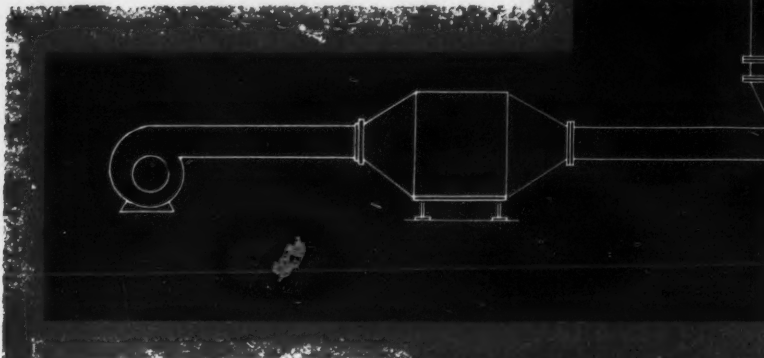
SPARKLER MANUFACTURING CO. MUNDELEIN, ILLINOIS
Sparkler International Ltd.—Manufacturing plants in Canada, Holland, Italy and Australia.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

**SPARKLER
FILTERS**

Check 1811 opposite last page

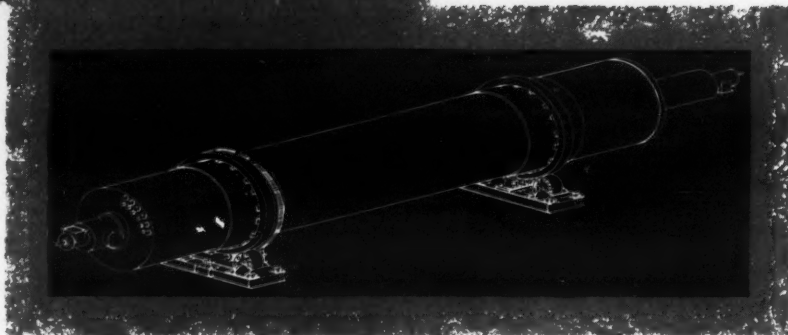


Continuous Atmospheric Rotary Dryer



Continuous Fluidized Bed Dryer

Continuous Solvent Stripper
Continuous Gas Solids Reactor
Continuous Vacuum Dryer



Now, at one convenient location, you can test-dry your materials in a variety of equipment

At General American's East Chicago pilot plant, you can test the drying or reacting of your materials in the widest range of drying equipment ever assembled in one place.

Louisville Dryer engineers will work with you—study your materials and needs, make recommendations for type of equipment, size and heating medium. You can check these recommendations for yourself through practical tests. Your Louisville Dryer is then engineered for most efficient and economical service—built specifically to meet your needs.

To test the drying of your materials in all these different types of drying equipment, call in a Louisville Dryer engineer. There is no cost or obligation.

tends down into cylinder. From hopper, reclaimed fines are returned to process.

Collectors have a narrow vertical rectangular shave-off port in upper section of cylinder (see schematic) which provides an immediate outlet for fines which tend to accumulate in eddy currents prevailing in this portion of collector. Fines flow through bypass duct to main body of dust in lower conical section of collector. Thus, they are collected and not exhausted to atmosphere.

Collector is proportioned to avoid turbulence in counter-flow gas streams and to provide powerful vortex which cooler loss would be 0.37 to dust chamber, at same time enabling dust-free gas to exit by outlet duct.

Results: Installation of the second-stage collectors has satisfactorily solved the dust emission problem. Both plant and city officials are pleased with the results. Actual results, as obtained by tests conducted by the Columbus Division of Smoke Regulation, were: dryer dust loss 0.41 lb per 1000 lb gas, cooler dust loss 0.44 lb per 1000 lb gas—well within prescribed limits. Dust losses in both cases were cut by well over 60%.

It is interesting to note that once operating conditions were known, calculated performance tallied very closely with actual performance. Calculations indicated that upon installation of second-stage units, dryer loss would be 0.42 to 0.48 lb per 1000 lb gas, and cooler loss would be 0.37 to 0.40 lb per 1000 lb gas.

(Second-stage dust collectors were manufactured and installed by Buell Engineering Company, Inc., 123 William Street, New York, N. Y.)

Check 1813 opposite last page.

NEXT MONTH

Low cost flow control forms an important part of Corn Products' centrifugal separation of starch and protein. Learn next month how a low cost, self-contained flow control valve does the job efficiently.



LOUISVILLE DRYER DIVISION

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street, Chicago 90, Illinois

Offices in principal cities

Check 1812 opposite last page

PROCESSING EQUIPMENT

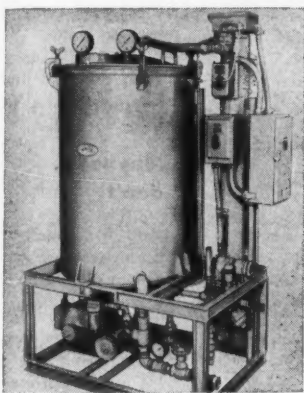
Oils up to 5000 SSU handled by package dehydration system

Removes water, gases, solids from various oils

Uses: Dehydrating, filtering, and deaerating various oils having viscosity up to 5000 SSU.

Features: Operating under vacuum, self-contained system reduces moisture content of oils to near zero point. Machine also removes 99% of solids and entrained or dissolved air and gases.

Description: Oil at suitable operating temperature is forced by atmospheric pressure through glass fiber filter elements into vacuum chamber. Emulsified and dissolved

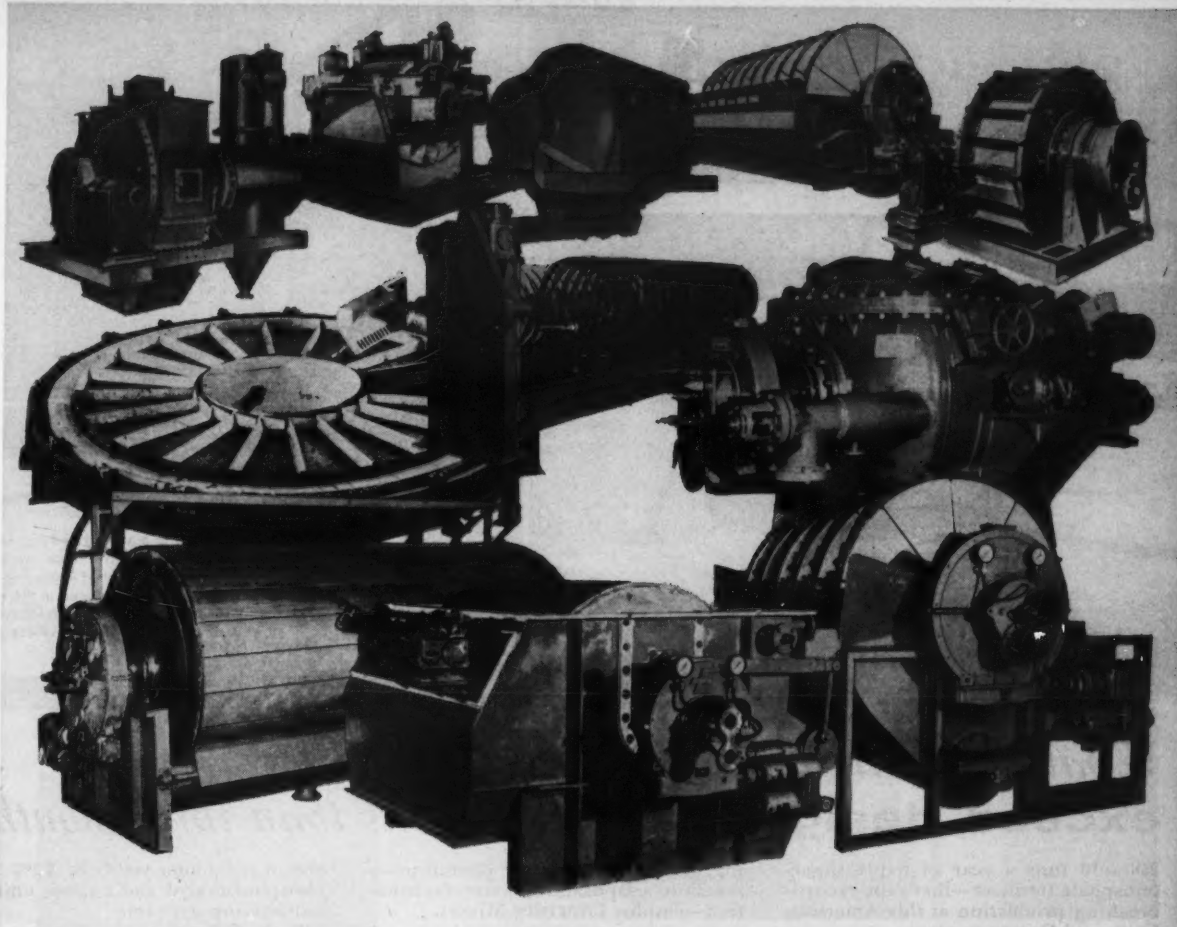


Vacuum dehydration systems are available in three sizes

water and other volatiles are removed by vacuum. Solid contaminants are contained within filter elements. Cooling jacket condenses steam and vaporized contaminants. These are then automatically ejected from system.

Units are electrically heated and are available in three sizes, 25, 120, and 360 gph capacity. Largest unit measures 28 x 42 x 67" high. It weighs about 890 lb. Smallest machine is 17½ x 23½ x 41" high. Unit weighs 250 lb. Water consumption for systems varies from 3 to 12 gpm (at 70°F and 40 psi).

(Fil-Thermo-Vac dehydration systems are product of Bowser, Inc., Fort Wayne, Ind.) Check 1814 opposite last page.



ONE OF THESE FILTERS MAY BE THE BEST FILTER FOR YOUR JOB

The picture of various types and sizes of continuous vacuum and pressure drum, disc, pan, plate and frame, top feed, precoat, string discharge, and other specialized filters — are but typical of the careful and extensive work which goes on in Eimco's large, modern engineering and manufacturing departments.

This is the final evidence that each process must use specialized equipment to produce the maximum

product at the lowest possible cost.

Users of Eimco processing equipment for liquid-solids separation will tell you that the extra quality of Eimco design and workmanship pays dividends through helping them achieve uniformly efficient results with a faster investment payoff through lower operating costs.

THE EIMCO CORPORATION

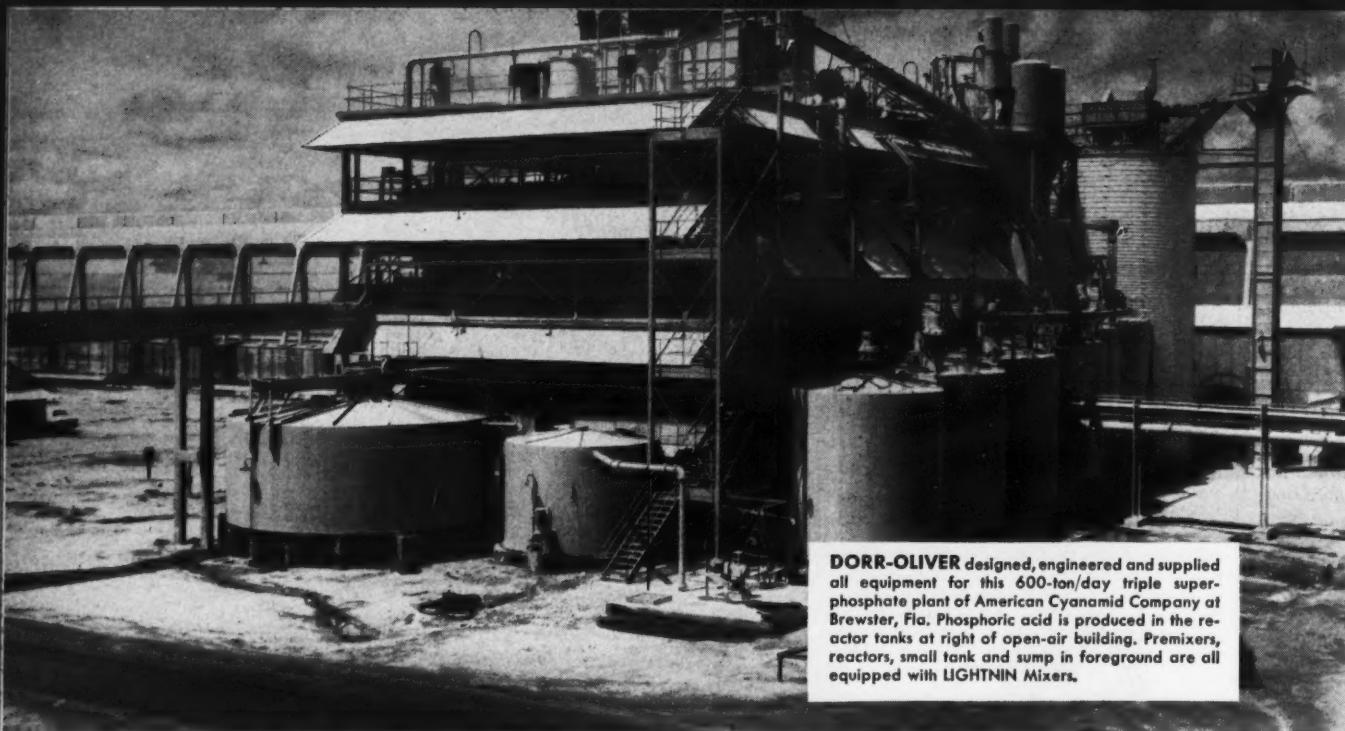
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BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



B-349

Check 1815 opposite last page



DORR-OLIVER designed, engineered and supplied all equipment for this 600-ton/day triple superphosphate plant of American Cyanamid Company at Brewster, Fla. Phosphoric acid is produced in the reactor tanks at right of open-air building. Premixers, reactors, small tank and sump in foreground are all equipped with **LIGHTNIN** Mixers.

What helped this Cyanamid plant exceed design capacity in less than three months?

200,000 tons a year of triple superphosphate fertilizer—that's the record-breaking production at this American Cyanamid Company plant.

Designed, engineered and equipped by Dorr-Oliver Incorporated, the plant reached its design capacity and guaranteed yields less than three months after initial startup.

How did they do it?

One part of the answer is good mixing.

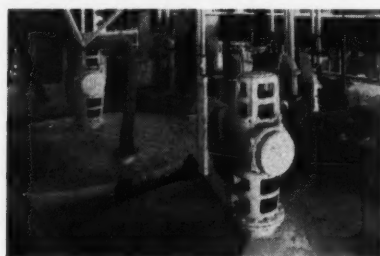


MORE THAN 1000 TONS of gypsum and 650 tons of 32% P_2O_5 phosphoric acid a day are handled by one 30-HP and five 60-HP **LIGHTNIN**s, largest mixers ever used for this purpose.

ing. Three of the major operations—reaction, evaporation, water reclamation—employ **LIGHTNIN** Mixers.

Optimum reactor yield

Every day, over 700 tons of phosphate rock and 600 tons of 98% sulfuric acid flow into the plant's two big premixers and four reactors. One 30-horsepower and five 60-horsepower turbine-type **LIGHTNIN** Mixers provide the intense but controlled agitation necessary to



TURBINE-TYPE LIGHTNINs in the seed tanks of American Cyanamid's vacuum evaporator station concentrate phosphoric acid from 32% to 54% P_2O_5 .

obtain maximum yields of 32% P_2O_5 phosphoric acid and coarse, uniform, fast-filtering gypsum.

In the three-stage vacuum evaporator system, turbine-type **LIGHTNIN**s keep the three seed tanks uniformly mixed.

Contaminated water at 3200 GPM is neutralized in two **LIGHTNIN**-equipped tanks, clarified in a 90-foot diameter Dorr Clarifier, cooled and reused, while acid wastes are neutralized in two other **LIGHTNIN**-mixed tanks prior to discharge.

"Good mixing" is the reason why Dorr-Oliver purchased **LIGHTNIN** Mixers throughout this record-topping plant—and why **LIGHTNIN**s are used in many plants designed by this experienced firm.

What this can mean to you

How important is good mixing in your process? For mixers that can help you get a new plant onstream faster... give you *guaranteed* answers to mixing problems... and trim fluid mixing costs to a minimum—see your **LIGHTNIN** Mixer representative. He's listed in Chemical Engineering Catalog. Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

WHAT MIXING OPERATIONS are important to you? You'll find a wealth of information on fluid mixing in these helpful bulletins describing **LIGHTNIN** Mixers:

- ☐ Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP (B-102)
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
- ☐ Top entering; propeller types: 1/4 to 3 HP (B-103)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Confidential data sheet for figuring your mixer requirements (B-107)
- ☐ Portable: 1/8 to 3 HP (B-108)
- ☐ Condensed catalog showing all types (B-109)

Check, clip and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.
In Canada: Greys Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We welcome your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING**, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 14)

Address your comments to: The Editor **CHEMICAL PROCESSING**
111 E. Delaware Place, Chicago 11, Illinois

For more information on product at left, specify 1816 see information request blank opposite last page.



PRO

Dust co

In illus pages, features collecto operati stallatio MSP-1 icals & Bldg., Check

Heat s faster, in dry

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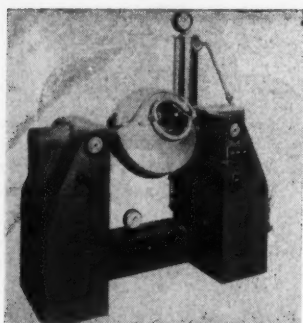
PROCESSING EQUIPMENT

Dust collector info

In illustrated bulletin of six pages, manufacturer discusses features and benefits of dust collector design. Principles of operation and some typical installations are included. Bul MSP-124A — Hagan Chemicals & Controls, Inc., Hagan Bldg., Pittsburgh 30, Pa. Check 1817 opposite last page.

Heat sensitives dried faster, more efficient, in dryer-blender

Uses: Drying heat-sensitives.
Features: Unit's design is such that heat-sensitive materials are dried in only a



Dryer-blenders operate under vacuum, are available in 14 sizes

fraction of the time required by conventional methods.

Description: Vacuum tumble dryer-blenders are available in 14 standard models, ranging in capacities from one to 150 cu ft. Charge openings range from 8 to 18". Swing radii range from 10-3/8 to 62". Compact units come complete with jacket, vacuum pump, piping, condenser, and instrumentation.

(Dryer-blenders are product of The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.)

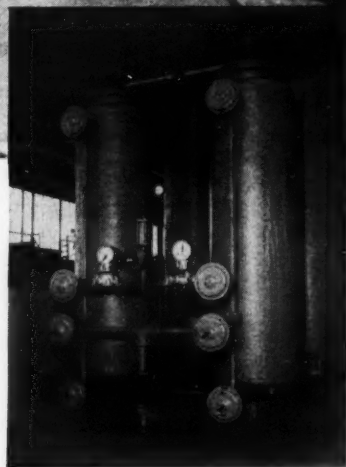
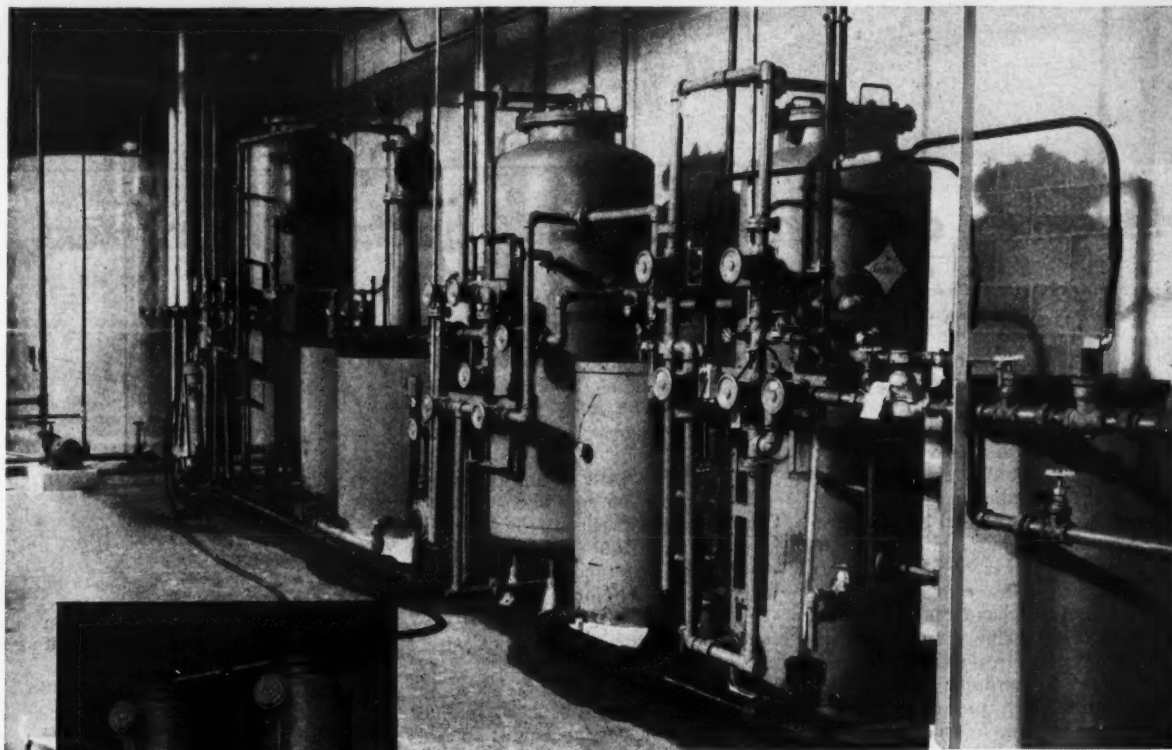
Check 1818 opposite last page.

Centrifuges for continuous chemical processing are described in 4-page bulletin. Illustrations cover bowl design, operating principles, and field of application. Bul 2422 — Centrico, Inc., 75 West Forest Ave., Englewood, N. J.

Check 1819 opposite last page.

INDUSTRIAL ION EXCHANGE TECHNIQUES

... low cost solution to specialized purification problems



EXAMPLE 1: Purification of Formaldehyde. Specialized anion exchange technique removes formic acid from formaldehyde. This Industrial semi-automatic, dual unit also "up-grades" water white formaldehyde for resin manufacture—yields final resins with resistance to off-color blush or bloom.

EXAMPLE 2: Chemical preparation. An Industrial mixed-bed ion exchange unit used for removal of sodium formate and formic acid from an organic polyhydric alcohol intermediate. Process facilitates subsequent purification by evaporation.

• Are you concerned with the removal of mineral impurities from solvent solutions—chemical intermediates—purification of glycerine—or other materials which usually require tedious, costly processing by alternate methods? If you are faced with the problem of purifying such materials, and if they contain even traces of moisture, then *Industrial*-engineered ion exchange techniques and equipment may provide a complete and inexpensive answer to your problem.

The two installations of *Industrial* ion exchange equipment illustrated here are typical of the many specialized applications of ion exchange developed and engineered by *Industrial* to meet specific chemical process industry requirements.

To evaluate the possibilities of these techniques to solve your purification problems, and to obtain an analytical study, consult *Industrial*, soon.



For general information covering *Industrial* Ion Exchange equipment, write for a copy of BULLETIN 200.

INDUSTRIAL

C-158

INDUSTRIAL FILTER & PUMP MFG. CO.

5908 Ogden Avenue, Chicago 50, Illinois

PRESSURE FILTERS ♦ ION & HEAT EXCHANGERS ♦ WASTE-TREATING EQUIPMENT

Check 1820 opposite last page



CONDENSER TUBE CLINIC

Edited by **ARTHUR W. TRACY**, Metallurgical Engineer,
The American Brass Company, Waterbury, Connecticut

Stresses and their Effects can be Minimized

STRESS-CORROSION CRACKING—The stress-corrosion cracking of copper alloys requires the simultaneous action of moisture, air, ammonia, and stress. Stresses may be residual or applied. All Anaconda condenser tubes are processed so as to minimize residual tensile stresses which may be formed during fabrication. Applied stresses from installing tubes in heat exchangers, nonuniform thermal expansion in tube bundles, or misalignment of condensers with other equipment occasionally cause stress-corrosion cracking.

Admiralty metal and aluminum brass tubes, although known to be susceptible to stress-corrosion cracking, seldom crack in condensers. Although ammonia is often present, either by chance or design, in vapors entering condensers, the amount of air (oxygen) is usually so small that the corrosive action of the ammonia is limited. It is obvious that noncondensable gases should be vented from condensers, not only to increase thermal efficiency, but to minimize corrosion.

ANACONDA Arsenical Admiralty-439 and ANACONDA Ambraloy-927 condenser tubes seldom stress-corrosion crack in normal service. Where operating conditions are severe enough to cause stress-corrosion cracking of these alloys, ANACONDA Cupro Nickel, 10%-755 and ANACONDA Cupro Nickel, 30%-702 tubes are recommended.

STRESS-RELIEF ANNEALING—Inasmuch as copper-alloy condenser tubes may stress-corrosion crack from stresses caused by cold-forming operations such as U-bending, the stresses should be removed by relief annealing the cold-formed portion of the tube.

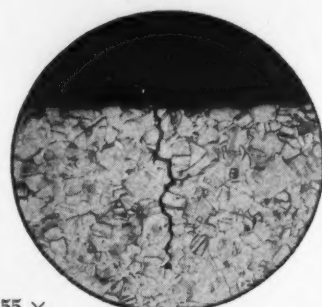
FATIGUE CRACKING—Vibrations from moving parts of equipment or from pressure pulsations can induce stresses in condenser tubes high enough to exceed the endurance limit and cause a fatigue-crack failure. Vibration of a tube may even disturb water flow enough to cause impingement pitting at the point of greatest amplitude of vibration and the resulting pits can act as stress raisers. Pulsations can often be dampened by placing baffles or grids in the path of high-velocity vapors. Vibration of tubes can also be dampened by placing wooden slats between rows of tubes. Cupro Nickel, 30%-702 Tubes are more resistant to fatigue cracking than admiralty and aluminum brass.

TECHNICAL ASSISTANCE—Your tube problem may need special consideration. We are always ready to advise in the selection of the right alloy to give the best service. Write for the new edition of Publication B-2. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. DATA

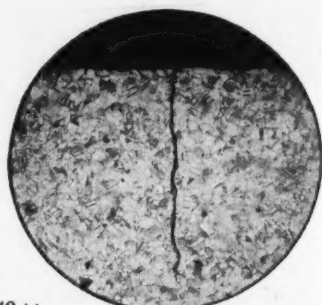
ANACONDA® Tubes and Plates for Condensers and Heat Exchangers

NOMINAL COMPOSITIONS OF SOME ANACONDA CONDENSER TUBE ALLOYS

	Arsenical Admiralty-439	Ambraloy-927 (Aluminum Brass)	Cupro Nickel, 10%-755	Cupro Nickel, 30%-702
Copper, %	71	77	88.35	68.90
Nickel, %	..	..	10	30
Zinc, %	27.96	20.96	..	..
Aluminum, %	..	2	..	..
Tin, %	1	..	..	..
Arsenic, %	0.04	0.04	..	..
Manganese, %	..	..	0.40	0.60
Iron, %	..	..	1.25	0.50



55 X.
Intergranular stress-corrosion crack in 70/30 brass tube from oil refinery heat exchanger. Longitudinal section.



40 X.
Transgranular stress-corrosion crack in admiralty metal tube from oil refinery heat exchanger. Longitudinal section.



40 X.
Fatigue crack starting at pit in aluminum brass tube from power plant condenser. Longitudinal section.

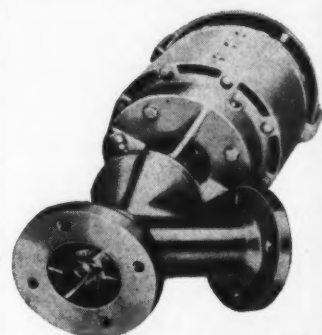
PROCESSING EQUIPMENT

**Unit fits into pipeline —
homogenizes and mixes
on continuous basis**

Uses: Homogenizing and mixing on continuous flow basis.

Features: Mixer combines continuous flow mixing with high-speed, high-shear homogenizing. Device can be installed on existing pipelines or made up with standard fittings for use where pipeline does not currently exist. Unit can also serve as pump.

Description: Machine is mounted on structural steel



Turbine rotates in enclosed housing (bottom). Mixer's discharge is at right

platform for easy mobility and installation. Mixer will combine mixtures of liquids, gases, and solids that can flow through pipe. Standard models have immersed parts made of stainless steel.

Device is powered by motor coupled to shaft turning the turbine. Turbine rotates in an enclosed housing, or stator, to form homogenizing head. Unrefined material is drawn from pipe into homogenizing zone by pumping action of turbine.

Product is forced through restricted openings in mixing head where it is sheared and broken down to small particle size. It is then discharged into outlet.

By forcing materials through restricted openings, they are subjected to intense forces of impact and hydraulic shear. Agglomerates are broken down in size and materials become a thoroughly mixed, homogenized fluid. If necessary, product can be recirculated for additional refinement.

Check 1821 opposite last page

PROCESSING EQUIPMENT

Units may be horizontally or vertically mounted. There are six standard models available, ranging from $\frac{1}{2}$ to 25 hp. Smallest turbine diam is 1.719". Largest is 5.625". Nominal diam for inlet pipe is from $\frac{3}{4}$ to 3".

("Pipe-Line" homo-mixer is product of Gifford-Wood Co., Hudson, N.Y.)

Check 1822 opposite last page.

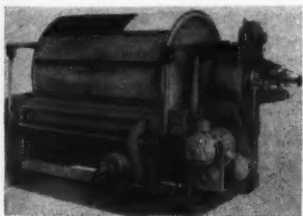
Rotary vacuum filter is built of plastic

Can handle mild corrosive solutions up to 170°F

Uses: Filtering mildly corrosive solutions.

Features: Unit is constructed of plastic, can handle liquids up to 170°F.

Description: Rotary drum vacuum filter is lightweight, economic, and simple to install. Components are made of molded plastic. Certain supporting structural members are made of resin-coated mild



Plastic rotary drum vacuum filter is designed for continuous operation at temperatures as high as 170°F

steel. Glass-fiber reinforced drum has molded plastic trunion and drum heads, revolves on steel shaft and drive bearing.

Drum surface is divided into longitudinal sections each of which is drained through molded rubber grids. Grids can be snapped in or out of place for easy inspection. Filter tank is also molded plastic. It is provided with PVC connections.

(Plastic rotary vacuum filters are product of Dorr-Oliver Incorporated, Havemeyer Lane, Stamford, Connecticut.)

Check 1823 opposite last page.

Sift it Fine and Fast ...right into the mixer

Reciprocating vertical and rotary motion of the screen in Readco vibrating sifters make it possible to sieve and aerate powdered and granular materials at high speed with maximum control. The illustration below shows the sifter mounted on twin Readco ribbon mixers. Here screw conveyors and screw elevator carry materials to the sifter, which discharges directly into the mixers.

Readco sifters are built in capacities to suit any production requirement, with ready adaptability to materials handling systems.

For information on specific applications, write to Read Standard Division of Capitol Products Corp., York, Pa., attention of Sales Manager, Chemical Equipment.



For more information on Readco processing equipment for the chemical industry, see Chemical Engineering Catalog, pages 1567 to 1574D.

READ STANDARD

York, Pennsylvania

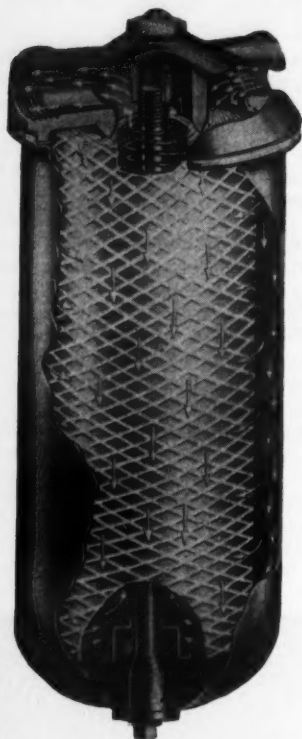
A Division of
Capitol Products Corporation

Check 1824 opposite last page

**Stainless steel filter
has one-piece shell —
is chemical resistant**

Uses: Unit provides microclarity to liquids and gases at operating pressures up to 150 psi.

Features: Made with one-piece drawn shell of 316 stainless steel, filter resists chemi-



Tubes in filter cartridge provide depth filtration

cal attack and oxidation. Flow rate for liquids of aqueous viscosity is 2½-5 gpm.

Description: Stainless steel filter uses filter cartridge having hundreds of filtering tunnels to provide depth filtration. Cartridges are available in Nylon, Orlon, Dacron, dynel, acetate, and glass fibers, and are manufactured in wide range of controlled densities. Filters are available in ¾ and ¾" pipe sizes. Air vent and drain plug are also included on the unit.

(SSB10 Fulflo Filter is product of Commercial Filters Corporation, 2 Main St., Melrose, Mass.)

Check 1825 opposite last page.

Greater Capacity . . .



Higher Pressures for Solids Dewatering

SHARPLES ADVANCED DESIGN CENTRIFUGES

P-7000 SUPER-D-CANTER—The largest of six sizes of continuous scroll type solids discharge centrifuges for the clarification of crystalline or amorphous solids . . . The P-7000 will handle solids at rates in excess of 12-15 tons/hr. *For operation at pressures to 150 psi.*

SUPER-D-HYDRATORS—These high efficiency crystal drying centrifuges are available in 3 sizes, the largest of which has a capacity on ammonium sulphate in excess of 20 tons/hr. *For operation at pressures to 150 psi.*

DH-6 NOZJECTOR—Designed to handle feeds in excess of 500 gallons per minute. This is the largest of 3 sizes of continuous solids discharge nozzle type centrifuges for the clarification and concentration of solids in slurries and sludges. *For operation at pressures to 150 psi.*

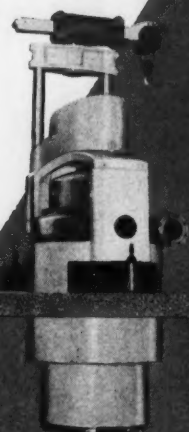
Sharples is setting new standards of capacity and all-round performance with the only really new centrifuges being offered today. If a solids dewatering step is necessary in your processing, it will pay you to get the facts from Sharples.

Your inquiry will be given our prompt attention.

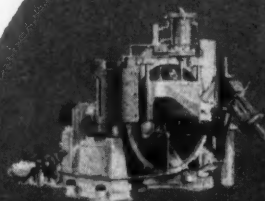


THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS
SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON • ST. LOUIS • ATLANTA
Associated Companies and Representatives Throughout the World

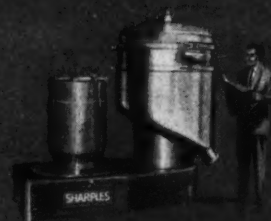
Check 1826 opposite last page



P-7000 VERTICAL SUPER-D-CANTER



SUPER-D-HYDRATOR for desiccating crystals



*

The DH-6 (right) is a pressure-rated NOZJECTOR—the largest and highest capacity nozzle type centrifuge available to industry.

PROCESSING EQUIPMENT

Acid or alkaline mists handled efficiently by gas absorber

Corrosion resistant parts featured throughout

Uses: Scrubbing vent gases and mists — either acid or alkaline. Unit is particularly well adapted to handling small process ventilation and laboratory vent problems.

Features: Absorber is compact, efficient, and well constructed. All exterior and interior components are fabricated of corrosion resistant materials.

Description: Unit consists of three stages. The first contains a Monel perforated Neva-clog screen to remove solids or other particulate matter. Second stage has 4" deep fiber



Corrosion-resistant gas absorber operates on three-stage principle

glass filter cells. Both stages are sprayed with absorbing liquid which is automatically maintained at fixed pH to minimize corrosion and consumption of neutralizing chemicals.

Final stage is designed to remove entrained moisture droplets. It consists of a 2" deep Dynel filter cell.

Absorber's shell is fabricated of 1/4" polyester resin-bonded fiber glass. All interior spray pipe and nozzles are made from rigid PVC. Washer cell frames are also constructed of PVC.

(Special No. 13 Design 7 gas absorber is product of Air Cleaning Division, Buffalo Forge Co., Buffalo, N.Y.)

Check 1827 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

In Formaldehyde Service Like This...

CHEMLON® RINGS

give more than
twice the life of
other packings

This report was made by the Spencer Chemical Co.'s Chicago Works on their Type 316 stainless steel valves handling 45% formaldehyde solutions with a pH as low as 3.5. Previous to the installation of Chemlon Molded Rings, packing life had been limited to six months. The Chemlon Rings have been in service over 1 year and continue to stand up well.

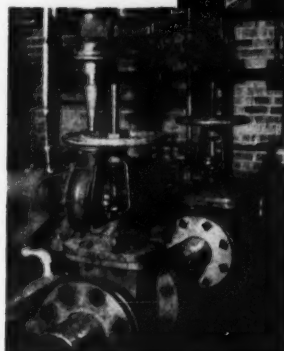
HERE AGAIN IS PROOF THAT CHEMLON PACKINGS ARE THE POSITIVE ANSWER TO YOUR TOUGH-TO-HANDLE CORROSIVE AND TOXIC LIQUID PROBLEMS AT TEMPERATURES FROM -120° TO +500°F. AND WITHOUT FEAR OF PRODUCT CONTAMINATION.

Chemlon Packings are fabricated from DuPont Teflon. Machined and molded types are supplied in ring form and are available with square or beveled ends or in odd shapes for special fittings.

Tell us about your problems or requirements. Request Bulletin P-325.

Crane Packing Company, 6421 Oakton Street, Morton Grove, Illinois, (Chicago Suburb).

In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



Photograph courtesy of Spencer Chemical Co.

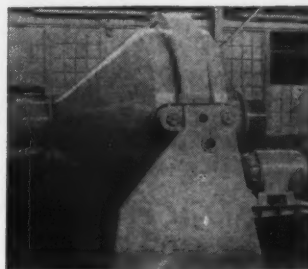
The ability of these stainless steel valves and Chemlon Rings to withstand the formalin solution contributes to the extremely low 0.2 ppm. avg. iron content of Spencer's formaldehyde.



CRANE PACKING COMPANY

Check 1828 opposite last page

PROCESSING EQUIPMENT



Giant mixer...

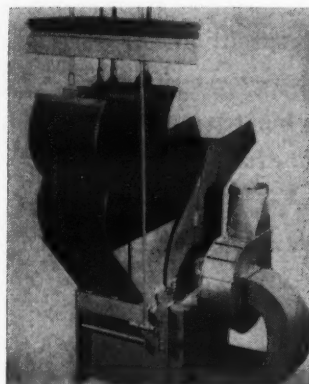
... has internal blades to set up flow action. Vacuum tight, unit can be charged by screw conveyor, and discharged by gravity or vacuum. Mixer lends itself to automation and can be operated continuously or batchwise, tilting to discharge. Mixer is available in either 60 or 90 cu ft capacity.

(Mixer is product of The T. L. Smith Company, 2835 North 32nd St., Milwaukee 1, Wisconsin.)

Check 1829 opp. last page.

No shutdown necessary when changing screens on hammer mill

Hammer mill screens can be changed instantly, with no delay in production, through use of simple device. Devel-



Any one of five screens can be inserted or removed while hammer mill is operating

oped by mill manufacturer for use on his line of equipment, attachment permits any one of five screens, up to 1/4" thick,

CONTAINER and LABOR SAVINGS

packing
barrels
cartons
drums
cans



VIBROX PACKERS

A rugged, mechanical packer, the Vibrox gets more of the material into the same size container... or the same amount into a smaller container. Users frequently report savings up to 20% in container costs alone—and additional savings of 15 to 33% in packing time.

The hard-working Vibrox requires no attention on the part of the operator. It operates continuously, packing the material down as the container fills. With a conveyor to carry the containers to and from the packer, the Vibrox makes a tough job easy—and economical.

If you pack a bulk material—in boxes, cans, cartons, kegs, drums or barrels weighing up to 750 pounds—find out what a Vibrox Packer will do for you. For specific recommendations on your packing problems, send a description of the material, and data on the type and size of containers. You incur no obligation, of course.

WRITE FOR A COPY OF BULLETIN 401

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING
EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP Co.

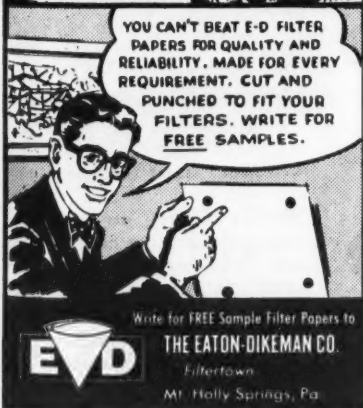
Engineers & Manufacturers Since 1872
1344 S. Cicero Avenue • Chicago 50, Illinois

Check 1830 opposite last page

CHEMICAL PROCESSING

FILTER TIPS

by E.D. FILPAPER



Write for FREE Sample Filter Papers to
THE EATON-DIKEMAN CO.
 Filbertown
 Mt. Holly Springs, Pa.

PROCESSING EQUIPMENT

to be inserted or removed while mill is operating.

Operator performs job by means of extension handles from floor above mill. Power does not have to be shut off and grinding continues practically uninterrupted. Easy operation is made possible by use of a patented eccentric lock. Operator simply releases screen lock, lifts up screen to be replaced, lowers new screen into position, and relocks entire mechanism.

Device can be adapted to any ceiling height. It is designed for use on any of manufacturer's series 10 mills.

(Further information about Floor-above screen change can be obtained from Schutte Pulverizer Company, Inc., 878 Bailey Avenue, Buffalo 6, New York.)

Check 1832 opposite last page.

Up to 1000 gal per hour handled by lightweight, low-cost centrifuge

Largest unit weighs 52 lb, costs only \$380

Uses: Clarifying various liquids in chemical, food, and allied industries.

Features: Centrifuges are lightweight for maximum mobility. Heaviest unit weighs only 52 lb. Machines are simple to install either with pipe or rubber hose. Centrifuges have simple design, high efficiency, and low initial cost.

Description: Units are available in two sizes — either 150 or 220 volts, 60 cy AC. Units machine develops centrifugal force 1217 x gravity, is 14" high x 12½" wide, weighs only 38 lb, and costs \$280.

Large unit develops 1391 g's, measures 15" high x 17" wide, weighs 52 lb, and costs \$380. Both machines operate on 110 or 1000 gph capacity. Small can be used in multiples for larger volume applications.

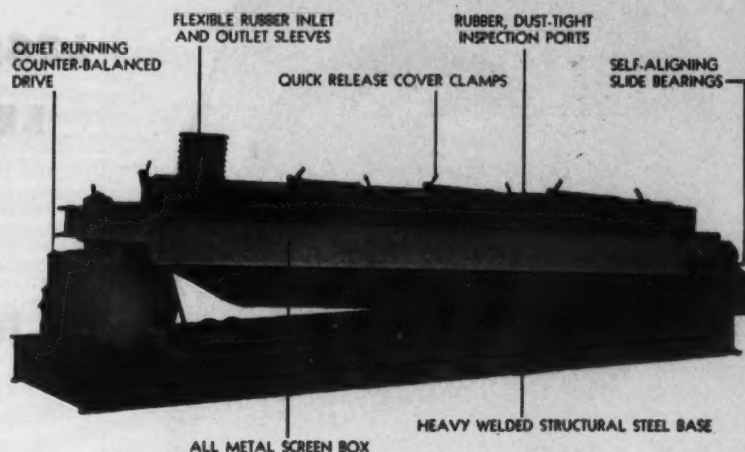
(Models 510 and 515 low-level centrifuges are product of A. M. Lavin Manufacturing, Davisville Road at Trenton Cutoff Railroad, Hatboro, Pennsylvania.)

Check 1833 opposite last page.

ROTEX

SCREENERS

GIVE PROFITABLE PRODUCTION!



For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

ROTEX FEATURES

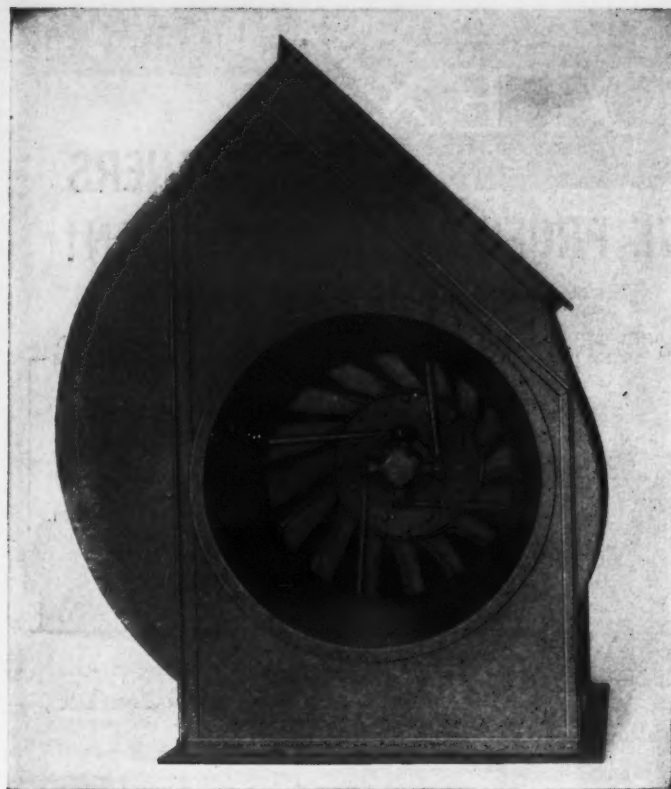
- Low head room
- Fast screen changes
- Dust-tite construction
- No screen blinding
- Dependable service
- Rugged construction

ROTEX

The Orville Simpson Company
 1246 Knowlton St., Cincinnati 23, Ohio

Check 1831 opposite last page

Check 1834 opposite last page



CORROSIVE GASES HANDLED WITH LESS MAINTENANCE LESS DOWNTIME

"BUFFALO" RUBBER-LINED FANS

● **Longer Fan Life**—Proved in hundreds of installations over a period of more than 30 years, actual records show that up to 12 times the life of ordinary metal fans may be expected from "Buffalo" Rubber-Lined Fans in severe corrosive fume service. Thus you will spend very little time maintaining the "Buffalo" equipped system in your plant.

● **Economies effected in the reduction of downtime** are equally impressive. The overall savings of longer life plus decreased downtime pay the slight additional cost of rubber lining many times over. A fact executive management can readily appreciate.

The "Buffalo" method of rubber-lining assures permanence. The rubber is actually "welded" into the pores of the metal with a union that is practically integral. With the "Buffalo"

Rubber-Lined Fan, corrosive fumes cannot touch metal—the inside of housing, rotor and shaft are completely rubber-protected.

Whatever your corrosive fume handling problem, your nearby "Buffalo" Engineering Representative will recommend the type of "Buffalo" Rubber-Lined Fan best suited to your requirements. Contact him, or write us for Bulletin 2424-F.

OTHER SPECIAL "BUFFALO" FANS FOR SPECIAL CONDITIONS—If you have a special air or materials handling job involving severe conditions ranging from corrosive fumes to abrasive dust, investigate "Buffalo" Resin-Bonded Fiber Glass Fans... Industrial Exhausters... Volume Fans... Pressure Blowers and Centrifugal Exhausters... Electric Blowers and Exhausters.

Every "Buffalo" product features the famous "Q" Factor — the built-in **QUALITY** that provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

BUFFALO PUMPS DIVISION, BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Check 1835 opposite last page

PROCESSING EQUIPMENT

Filter withstands 1000°F, removes bacteria, dust, radioactive particles

Uses: Removing bacteria, radioactive particles, and other fine particulate matter from air streams.

Features: Minimum efficiency is 99.97% based on removal of 0.3-micron particles. Filters withstand 1000°F and 100% relative humidity.

Description: Redesigned filters use filter media consisting of combination of selected glass and asbestos fibers. Use



Glass-asbestos filter media on air filter has top efficiency, resists high temp, moisture

of only inorganic fibers assures maximum moisture and mildew resistance.

Filter capacity has been boosted by increasing the number of pleats. Rated capacity of 24x24x11½" unit at 1" wg is 1100 cfm. Filter of this size has over 200 sq ft of filter media.

(Absolute filters are product of Cambridge Filter Corporation, 738 Erie Boulevard, East, Syracuse 3, New York.)

Check 1836 opposite last page.

Compact heat exchanger

Specific figures on fuel savings, comparative compactness and lightweight, quick installation, and ease of maintenance of heat exchanger are presented in 12-page illustrated "Fin-Pak" bul — The Air Preheater Corp., 60 East 42nd St., New York 17, N.Y.

Check 1837 opposite last page.

WOLVERINE TUBE

*Items of Interest
to the Processing Industry*



PUBLISHED BY WOLVERINE TUBE DIVISION

Use TRUFIN TYPE S/T in both Old and New Units

Wolverine Trufin Type S/T is a completely versatile heat exchanger tube—is equally at home in new units or old. When new heat exchangers and condensers are designed around Type S/T they are smaller and more compact because its integral fins increase heat transfer surface—handle more BTU's per foot of tube.

The net result is a substantial saving in direct tube costs as well as in labor and the materials that go into headers, baffles and shells.

When used for retubing purposes Trufin Type S/T steps up the capacity of existing equipment because its greater surface area packs more heat transfer surface into the same size shell.

Also of major importance when retubing is the fact that Trufin Type S/T is completely interchangeable with the plain tube it is designed to replace. During the finning process the ends of the tube are left without fins so that the O.D. of the plain end is slightly larger than the O.D. over the fins.

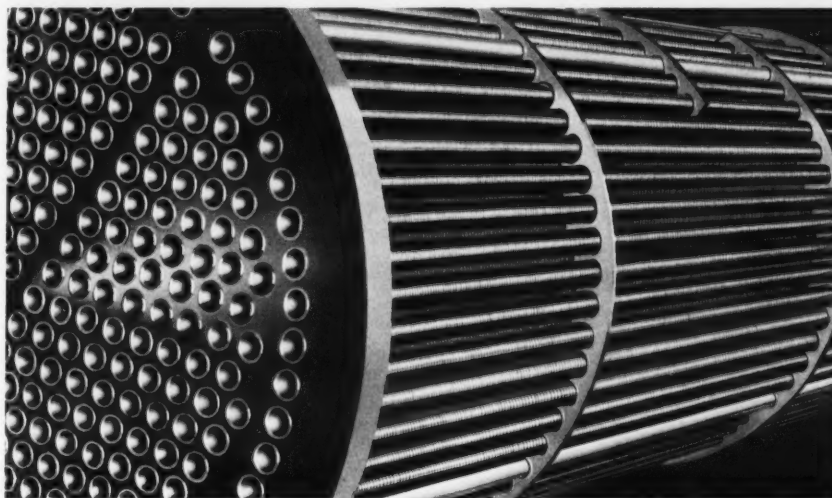
Because of this, Type S/T can be inserted into the bundle and rolled directly into the tube sheet in the regular manner using only standard tools and retubing techniques.



Wolverine Trufin Type S/T

TECHNICAL HELP FROM FIELD ENGINEERING SERVICE

Always available to help customers solve problems in alloy selection, design, corrosion, etc., are the skilled members of Wolverine's Field Engineering Service.



HOW WOLVERINE TRUFIN® TYPE S/T SAVED 17 MILES OF TUBE FOR A LARGE EASTERN FABRICATOR

BY ERNEST DODD

No matter how you look at it 17 miles of condenser tube adds up to a lot of tube—and, when those 17 miles represent the amount of tubing saved in one installation then it becomes a significant figure indeed.

This substantial saving in direct tube costs occurred recently when engineers for a large eastern fabricator designed heat transfer units for an M.E.K. plant around Wolverine Trufin Type S/T—the original, integrally finned tube for shell and tube equipment.

The units included condensers, coolers, reboilers, and product heater, etc. From previous experience their engineers knew that with Wolverine Trufin Type S/T they could design units with smaller shells and still realize maximum throughput, save space by obtaining more compact arrangements and greatly reduce the amount of tubing required.

For example, had the units been tubed

with prime surface tubing approximately 225,000 feet would have been required. To OBTAIN EQUIVALENT HEAT DUTY only 134,000 FEET OF WOLVERINE TRUFIN TYPE S/T WAS NEEDED—a saving of 91,000 feet or approximately 17 miles of heat exchanger tube.

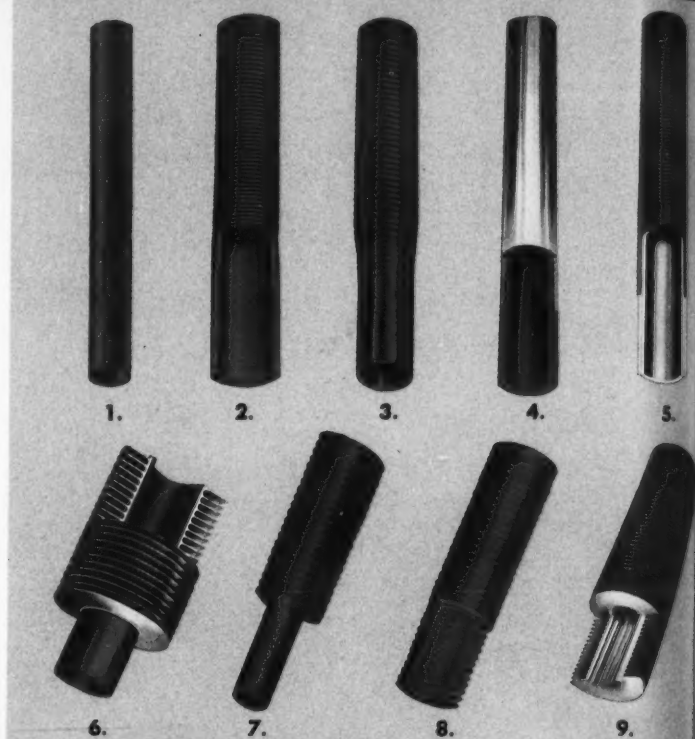
Wolverine Trufin Type S/T is available in a wide range of sizes in copper, copper alloys, aluminum, and steel. In addition to the installation described above it is ideally suited for such operations as crude stills, reformers, cat crackers and alkylation plants, etc.

Next time you're considering new equipment, specify Wolverine Trufin Type S/T. If you're retubing, Trufin Type S/T can increase the capacity of existing equipment by as much as 70%—depending on the type of service in which it is used. Either way you can't lose. Write—TODAY—for complete information.

CONDENSER TUBES FOR EVERY JOB

From its years of experience in the heat transfer field Wolverine Tube has developed a condenser tube lineup designed to meet every need. Engineers can, for example, specify prime surface tube . . . integrally finned (Wolverine Trufin) or duplex tubing . . . all in a wide range of sizes and alloys. Next time you specify heat exchanger tubing remember that Wolverine Tube can meet *ALL* your needs.

1. PRIME SURFACE TUBE
2. WOLVERINE TRUFIN TYPE S/T
3. WOLVERINE TRUFIN TYPE W/H
4. PRIME SURFACE DUPLEX TUBE
5. WOLVERINE TRUFIN-DUPLEX
6. WOLVERINE TRUFIN TYPE L/C
7. WOLVERINE TRUFIN TYPE H/R
8. WOLVERINE TRUFIN TYPE H/A
9. WOLVERINE TRUFIN TYPE I/L



TECHNICAL HELP FOR EVERY JOB



R. B. DAVIS
8941 Schaefer Hwy.
Detroit 28, Mich.
WE 1-0783



J. A. MARSHALL
148 Spear St.
San Francisco 5, Cal.
SU 1-7222



N. J. KOETZOW
Room 4004
60 East 42nd St.
New York 17, N. Y.
MU 2-8430



A. L. CLAEYS
Room 1408-10
Liberty Trust Bldg.
Philadelphia 7, Pa.
RI 6-1442



H. F. POWELL
2 North York St.
Corner of Commerce
Houston 3, Texas
CA 2-6191



S. E. WESSELS
2 North York St.
Corner of Commerce
Houston 3, Texas
CA 2-6191



W. A. WALLACE
P. O. Box 569
Nat. Bank Bldg.
Evanston, Ill.
Evanston—DA 8-8600
Chicago—RO 4-7410

If you're having trouble with heat transfer problems . . . such things as equipment design or alloy selection you can obtain expert help real fast. Just get in touch with one of Wolverine Tube's Technical Sales Representatives. They're as close as your telephone and because of their specialized training are fully qualified to help you solve the most difficult problems. Call on them next time you need help.

CALUMET & HECLA, INC.
CALUMET DIVISION
URANIUM DIVISION
GOODMAN LUMBER DIVISION
WOLVERINE TUBE DIVISION

In Canada:

CALUMET & HECLA OF CANADA LIMITED
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CANADA VULCANIZER & EQUIPMENT CO. LTD.
SERFIN TUBE DIVISION



WOLVERINE TUBE
DIVISION OF
CALUMET & HECLA, INC.

17234 Southfield Road
Allen Park, Michigan

Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA

SALES OFFICES IN PRINCIPAL CITIES

EXPORT DEPT. 13 E. 40TH STREET, NEW YORK 16, NEW YORK

Wolverine Trufin is available in Canada through
the Unifin Tube Division, London, Ontario.



Radioactive dusts removed by cellulose ester membrane filters

Uses: Filtering air or gases.

Features: Membrane filters are made of cellulose esters and range in thickness from 50 to 120 microns. Units can remove radioactive dust particles, have low air flow resistance, are flexible, and have high mechanical strength.

Description: Membrane filters are available in sizes ranging from 20 to 300 mm circle. Air permeabilities vary from 15 to 700 liters/min/100 sq cm, depending upon type of membrane. Pore size ranges from 0.3 to 10 microns. Filter with 0.6 to 0.8 pore size is recommended for recovery of radioactive particles. This unit has 50-100 liters/min/100 sq cm air flow rating and retains particles less than 0.3 micron.

Units are resistant to 20% sulfuric, nitric, and hydrochloric acids, 1% potassium or sodium hydroxide, and many organic solvents. Dusts collected on membranes may be brought into suspension by dissolving filters in acetone or other low molecular weight ketones, alcohols, or esters.

Prices for single box of 100 membrane filters range from \$8.30 to \$199.50, depending upon size. Units are made in West Germany.

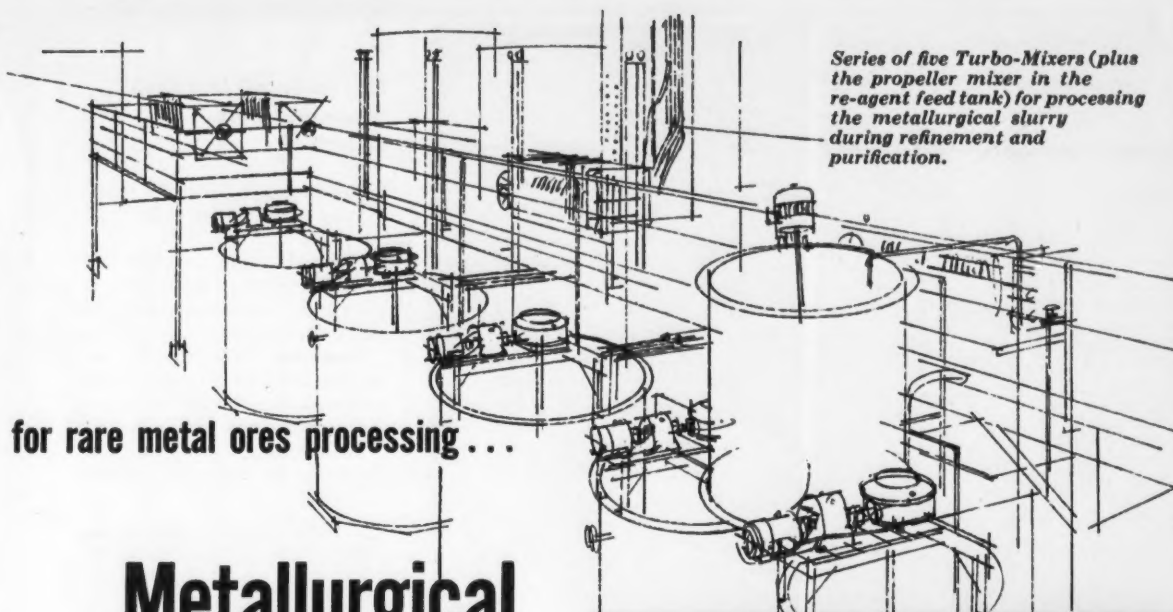
(Further information about Aersosol membrane filters may be obtained from Gelman Instrument Company, 233 Jefferson Street, Chelsea, Mich.) Check 1838 opposite last page

Rotary feeder valve data

Valve designed for positive, accurate feeding into pressure vessels, with minimum of steam or temperature loss is detailed in four-page bulletin which includes simple table of specifications. Bul 197 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1839 opposite last page.

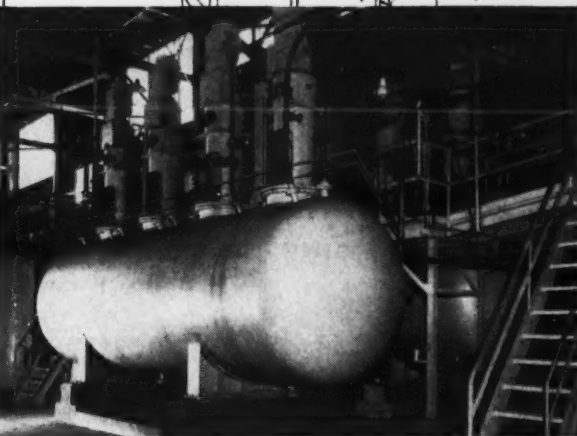
For more information on product at left, specify 1840 . . . see information request blank opposite last page.



for rare metal ores processing . . .

Metallurgical Resources chooses TURBO-MIXERS

There is no easy way to extract rare metals from their ores. Processing plants, such as that of Metallurgical Resources, Inc. of Newburgh, New York, call for skillful design and dependable processing equipment. To help put this new plant "on stream", Turbo-Mixer custom made all of the equipment required.



Four-compartment autoclaves for pressure leaching of ore. Each mixer consists of a mixing and aeration assembly to accomplish the contacting of the liquid-solid-gaseous phase system.

Turbo's 45 years of experience in design . . . Turbo's record of dependability . . . and Turbo's single-source responsibility make the difference. If you are in the process of selecting or specifying mixing equipment, call on Turbo. You'll find . . . it pays to plan with General American.

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s):

General Turbo-Mixer Bulletin _____

RDC Extraction Column Bulletin _____

Side Entering Propeller Mixer Bulletin _____

Absorption & Oxidation Bulletins _____

TURBO-MIXER DIVISION
GENERAL AMERICAN
TRANSPORTATION
CORPORATION



Sales offices: 380 Madison Avenue, New York 17, New York • General Offices: 135 South LaSalle Street, Chicago 90, Illinois • Offices in all principal cities

Check 1841 opposite last page



WELDING...

X-RAYING...

2-inch-thick seam at Downingtown

Item: Air Dryer Cylinder

Material: Carbon Steel

Thickness: Head, 2"—Shell, 2-5/16"

Design Pressure: 3200 psi

Hydrostatic Test Pressure: 5400 psi

Design Temperature: 450° F.

Stamping: National Board and ASME

X-rayed and stress relieved. Inspection by purchaser and Hartford. One of 8 identical units. The rest of our plant equipment is geared to our capacity for welding 2-inch-thick material and lifting 80 tons. Write for bulletins; illustrating Downingtown equipment and experience.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee
Branch offices in principal cities

**HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS**



Check 1842 opposite last page

PROCESSING EQUIPMENT

**Coil on processing tank
is integral part
of jacket**

Vessel costs about 1/3 less
than conventional units

Uses: Heating, cooling, or
storing various materials in
chemical, pharmaceutical, or
allied industries.

Features: Unit can be in-
stalled anywhere conventional
jacketed vessels are used, yet
costs about 1/3 less.

Description: Tanks are
available in capacities ranging



Jacket's outer panel is embossed
to form coil channels

from 66 to 1587 gal. Two
sheets of metal comprise jack-
et. Outer panel (mild or stain-
less steel) is embossed to form
coil channels running into a
header. Seam welding under
pressure unites this embossed
sheet to inside flat compan-
ion sheet of stainless steel.
Jacket is then rolled to size
and welded to finished tank.

All inside tank welds are
ground flush to No. 4 finish.
Cone bottom has sanitary
radius at edge. Top edge is
reinforced with stainless-steel
formed bar. Coil header has
1 or 1½" male steam inlet and
¾" condensate outlet for easy
connection to plant lines.

(Panel-coil jacketed vessels
are product of F. H. Langsen-
kamp Co., 225 E. South Street,
Indianapolis 25, Indiana.)

Check 1843 opposite last page.

"SCREEN OUT" PRODUCT PROBLEMS

WITH



BEE-ZEE SCREENS

Irregular or inferior product quality
is more than a production headache
—it means sagging sales and sag-
ging profits. But you can stop costly
screening problems in a hurry with
superior Bee-Zee Screens... the dif-
ference between problems and profits!

Welded, stainless steel Bee-Zee
Screens resist clogging—give you
better dewatering or deliquifying
... better separation ... better siz-
ing ... better product quality!

Find out from your screening equip-
ment manufacturer how Bee-Zee
Screens can save you money...
make you money! Or, write, wire or
phone Galesburg 2-5154 collect.



ROUND-ROD SCREEN
long-life accuracy



GRIZZLY ROD SCREEN
rugged accuracy



ISO-ROD SCREEN
prolonged accuracy



TRI-ROD SCREEN
knife-like accuracy



**GRIZZLY ROD WITH
SKID ROD**
ruggedest accuracy

BIXBY-ZIMMER ENGINEERING COMPANY

7108 Abingdon Street, Galesburg, Illinois

Check 1844 opposite last page

CHEMICAL PROCESSING

Describes scrubber

Bulletin of four pages describes how manufacturer's scrubber removes 99.5% or more of all solid or liquid entrainment in gas or vapor. Details on operation, together with design variations are included in Bul 500 — Centrifix Corp., 3608 Payne Ave., Cleveland 14, Ohio.

Check 1845 opposite last page.

Both wet, dry uses for tough nylon filter fabrics

Uses: Filtering dry, wet, or sticky materials.

Features: Nylon fabric has tensile strength of over 200,000 psi and is highly resistant to both wet and dry abrasion. Material withstands temperatures up to 250°F.

Description: Fabric resists strong alkalis, oxidizing chemicals, common solvents, oils, greases, and weak acids. Product is especially recommended for difficult cake release problems. Fabric is smooth and has well-defined interstices.

Material has been used successfully for dry-sifting starch, flour, abrasives, and for filtering such sticky materials as casein and lactalbumin. Particles ranging in size from 25 to 3000 microns can be removed.

Manufactured in Switzerland, the complete line consists of over 200 different nylon filter fabrics. Both yard goods and fabricated elements come in wide range of weights, porosities, and solids retention.

(Further information about Nitex filter fabrics can be obtained from Technical Fabricators, Inc., 136 Washington Avenue, Nutley, N.J.)

Check 1846 opposite last page.

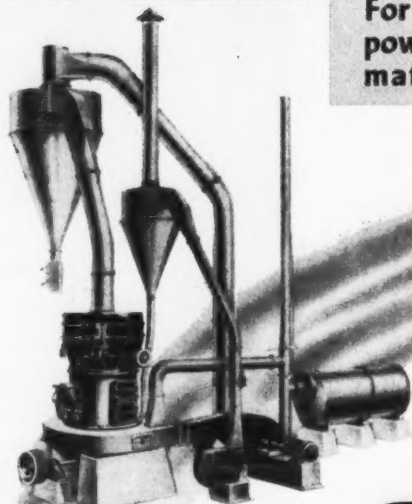
Use of centrifugal clarifiers to speed wine production is described in eight-page bulletin that provides tables of rated capacities, fields of application, and advantages of three types of centrifuges. Bul 2401 — Centrico Inc., 75 West Forest Ave., Englewood, New Jersey.

Check 1847 opposite last page.

THE RAYMOND SYSTEM

of Flash Drying

For production of fine dry powdered materials by automatic dust-free operation.



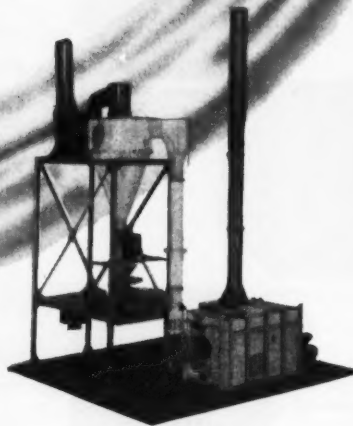
ROLLER MILL
with Flash Drying
for fine grinding



IMP MILL
with Flash Drying
for fine grinding



CAGE MILL
with Flash Drying
for disintegrating



AIRSTREAM
Flash Drying System
without pulverizing

FURTHER INFORMATION

Write for Bulletins describing any of these machines that may apply to your products.

RAYMOND Flash Drying is available with different types of equipment, shown above, for handling a wide range of operations and materials.

It is a clean dust-free automatic system for removing moisture from fine particles by a high-velocity heated airstream. It delivers a fine, dry, uniform product of specified fineness and dryness.

It offers new economies in the manufacture of fine chemicals, pigments, synthetic resins, hydrated compounds, filter cakes, food products, gypsum and clays.

Combines in one integrated system the functions often performed by several different units. Uses minimum building space for a given capacity. Provides accurate control of final moisture content in the finished material. Minimum attention and operating labor with continuous automatic operation. Instantaneous moisture removal (6 to 10 seconds) assuring a high quality product. Safe operation with only a small quantity of material in the system at any time.

COMBUSTION ENGINEERING, INC.

1317 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

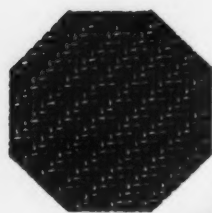
Raymond Division

SALES OFFICES IN
PRINCIPAL CITIES

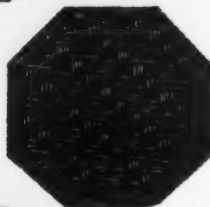
COMBUSTION ENGINEERING-SUPERHEATER LTD., Montreal, Canada

Check 1848 opposite last page

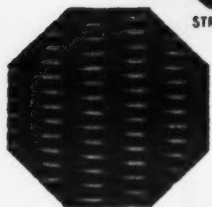
Newark Metallic Filter Cloth ...



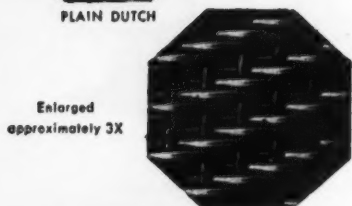
TWILL



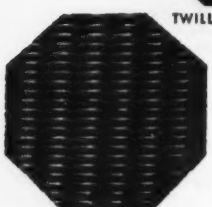
STRANDED TWILL



PLAIN DUTCH



TWILL DUTCH SINGLE



TWILL DUTCH DOUBLE

Enlarged
approximately 3X

Newark Metallic Filter Cloth does stop solids — the wedge-shaped openings allow only the filtrate to pass through. And, Newark Cloth is reversible, both sides being identical. Newark Metallic Filter Cloth is woven firmly and uniformly without loose wires, guaranteeing good filtration all over.

Newark Metallic Filter Cloth is available in a variety of weaves in all malleable metals, and is adaptable to practically all types of filters. When writing, please give us details on your process.

Send For Literature

Newark
Wire Cloth
COMPANY

NEWARK
for ACCURACY

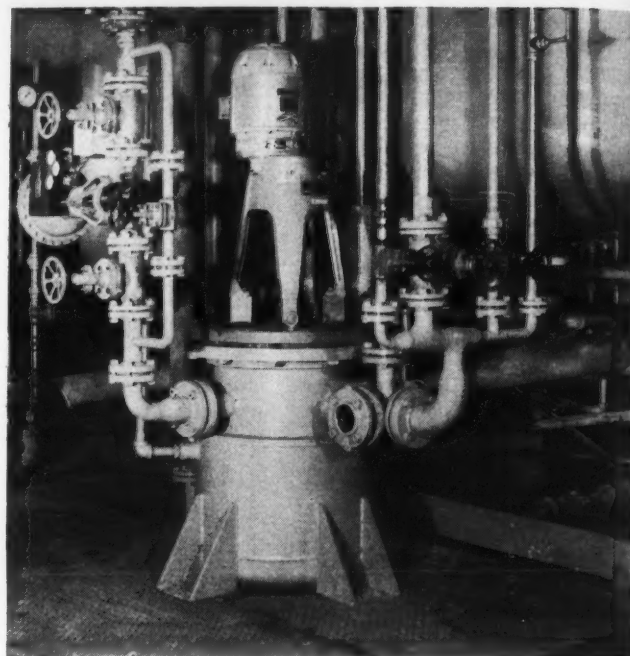
351 VERONA AVENUE • NEWARK 4, NEW JERSEY

Check 1849 opposite last page



**PLANT ENGINEERING
MAINTENANCE & SAFETY**

... electrical & mechanical developments



At Hooker Chemical Corporation's Hetron plant in Niagara Falls, N. Y., high-purity, corrosive materials stay contamination-free as ...

THEODORE W. WETT, Assistant Editor
with **ROBERT F. SCHULTZ**, Works Manager
Hooker Chemical Corp., Niagara Falls, N. Y.

Problem: Freedom from contamination is important to maintain quality of Hooker Chemical Corp.'s Hetron fire-resistant polyester resins. Although finished products are non-corrosive, a number of raw materials and intermediates used in the manufacture of these resins are corrosive in nature. Smooth flow within process lines is imperative to prevent areas of concentrated attack.

Products of corrosion could seriously affect color and mechanical characteristics of the finished product.

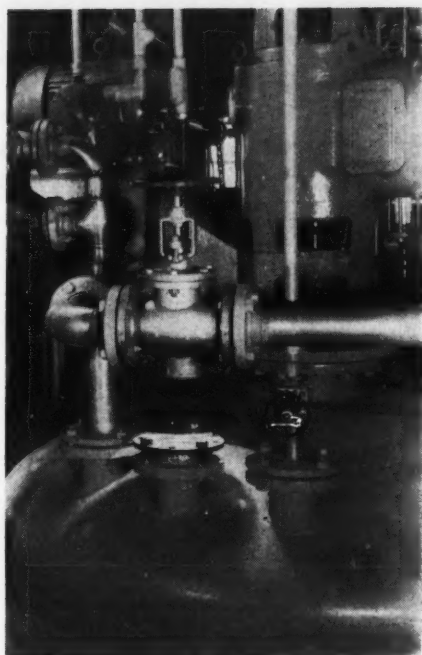
Hetron resins are based on hexachloroendomethylene-tetrahydrophthalic acid, or HET acid. HET acid is produced from hexachlorocyclopentadiene and maleic anhydride. It is then reacted with a suitable dihydric alcohol and dibasic acid such as maleic anhydride to form an unsaturated polyester chain.

The HET-based polyester reacts with a styrene cross-linking agent, under influence of a catalyst such as benzoyl peroxide, to form Hetron.

Product tests 20 to 30 in the Underwriters' Tunnel Test for

CHEMICAL PROCESSING

Styrenator at Hooker. Cross-linking reaction is triggered by a peroxide catalyst. Welding fittings keep raw materials and intermediate products contamination-free



Blend tank for finished resin. Welding fittings for finished product piping system avoid accumulation

welding fittings protect quality of polyester resin

fire-resistance. Conventional resins show flame spread ratings in excess of 400. Hetron is rated by Underwriters' Laboratories as fire-retardant.

Solution: To handle corrosive, high-purity raw materials and intermediates, as well as to avoid accumulation in transferring finished product, Hooker installed 316 stainless steel piping. Ells, tees, and reducers are all welding fittings also of stainless. Piping is schedule 10, and ranges from 1 through 8 inches.

Welded construction assures smooth interior walls with minimum flow resistance and product accumulation. Original installation took place in late 1954 when facilities were first erected. In 1956, when process was doubled in capacity, same materials were used.

Results: Welding fittings have been instrumental in providing a piping system which protects quality of finished resin. Smooth flow of materials due to smooth interior walls keeps material from accumulating and contamination-free.

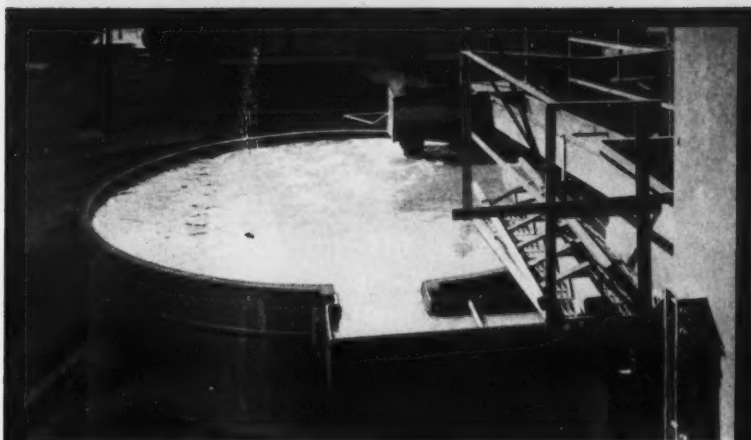
Service is excellent and no maintenance has been required.

(Flowline welding fittings are a product of Flowline Corp., New Castle, Pa.)

Check 1850 opposite last page.

(For more information on Hetron flame-resistant resins, contact Durez Plastics Div., Hooker Chemical Corp., Walck Road, North Tonawanda, New York.)

Check 1851 opposite last page.



CHEMICAL STORAGE AND HANDLING WITHOUT COSTLY CORROSION!

Tanks of Beetle's Bonate®

Now, you can store and process corrosive chemicals, without the old corrosion maintenance problems, with tanks fabricated by Beetle of Bonate plastic. The 7,000 gallon "Bonate" tank above has handled selenious acid at 160°F since 1954 without showing a trace of corrosion. The tank shown below has been storing 23% sulphuric acid for over three years at a large western copper refinery and has been maintenance free.

Tanks, covers and hoods of any size can be made of Beetle's Bonate in one piece or in sections for easy installation in confined, cramped areas. Light-weight, non-conductive and temperature resistant, Beetle's Bonate storage tanks and processing equipment deserve your immediate attention. For full information, write now.



145 GLOBE STREET, FALL RIVER, MASS.



Check 1852 opposite last page

Are Entrainment Losses Stealing Your Profits?



GET
THESE
NOW!



Centrifix®

SCRUBBERS • PURIFIERS • SEPARATORS

Increase Your Profits!

1. Increases efficiency of existing equipment—get more production PLUS valuable by-products that help pay for this improvement.
2. Removes 99.5% or more of ALL solid or liquid entrainment in gas, air, steam or vapor regardless of density, chemical characteristics or size (even 1 micron or smaller).
3. Protects valuable capital equipment from costly shut-downs and major overhaul.
4. Reduces maintenance cost—no moving parts, no filters, non-clogging, self-cleaning.
5. Operates with MINIMUM pressure drop regardless of pressure, temperature or flow rate.
6. Easy to install—saves space, low cost.

AA-8246



Centrifix® CORPORATION

3608 PAYNE AVENUE
CLEVELAND 14, OHIO

All Centrifix equipment is protected by U. S. Letters Patent & Patents Pending

Check 1853 opposite last page

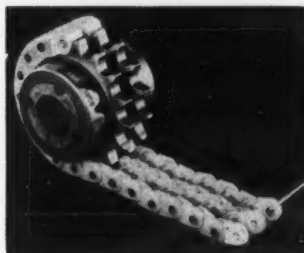
ENGINEERING & SAFETY

**No need to lubricate
flexible coupling
of nylon**

Chain unit has nylon links
joined by stainless pins

Uses: As flexible coupling
in corrosive service for loads
from fractional to 40 hp.

Features: Chain coupling
is constructed of nylon seg-
ments and stainless steel pins.
It does not need lubrication
and resists corrosion.



Nylon chain coupling costs 20%
less than all-steel counterpart

Description: Units cost about
20% less than all-steel coun-
terparts. Complete couplings
(1/2" pitch links and soft steel
sprocket) or chain elements
are available.

(Nylon coupling is supplied by
Morse Chain Company, Ithaca,
New York.)

Check 1854 opposite last page.

Magnetic equipment uses

Booklet of 48 pages describes
many and varied applications
of permanent, non-electric
magnetism in modern material
handling and magnetic sepa-
ration equipment. "Magnetic
Ideas From Eriez" — Eriez
Manufacturing Co., 70D Mag-
net Dr., Erie, Pa.

Check 1855 opposite last page.

NEXT MONTH

How American Potash &
Chemical Corporation whipped
a difficult flotation processing
problem and boosted lithium
concentrate recovery 11 per-
cent at its Trona plant, is sub-
ject of feature story in next
month's New Solution section.

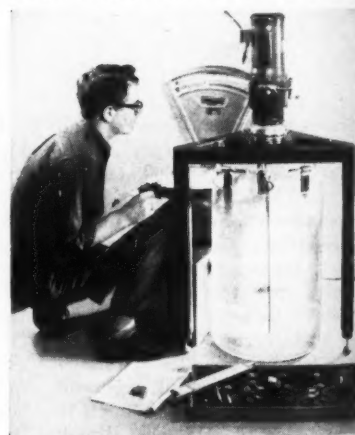
NEW CHEMINEER AGITATOR KIT CONTROLS MIXING VARIABLES

In scale-up, this complete laboratory ex-
perimental agitator kit provides every-
thing you need to make fast, accurate
determinations of mixing requirements;
or use it as a flexible component in bench
scale processes. All variables are under
your control, and the illustrated hand-
book supplied makes it easy to specify or
set up the correct agitation characteristics.

Full-scale geometric, kinematic, and
dynamic similarities of Newtonian and
non-Newtonian fluids are duplicated in
Model ELB kit pilot plant and bench
scale-up tests.

Contained in a sturdy, portable case,
Model ELB features a constant speed
1/4 hp. motor with a micrometer con-
trolled variable speed transmission. Lin-
ear dial-speed relationship gives 0 to 1100
rpm, with low speed torque multiplica-
tion. Also included are 22 calibrated im-
pellers, 3 shafts, and universal mounting.

A dynamometer accessory gives horse-
power requirements directly. Complete
line of other accessories available. Hand-
book alone available for \$1.50 postpaid.
Ask about our rental-purchase plan.
WRITE FOR FREE BULLETIN 109.



See our industrial equipment in
CEC. Complete catalog on request.

CHEMINEER, Inc.

Fluid Mixing Engineers

1044 East First Street, Dayton 2, Ohio
Phone Baldwin 2-8361

Check 1856 opposite last page

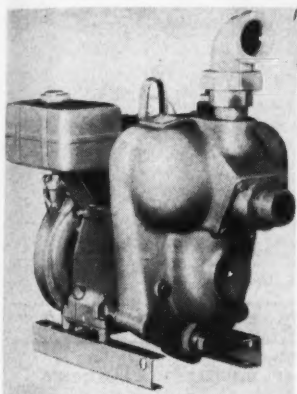
CHEMICAL PROCESSING

**Rapid priming offered
by centrifugal pumps**

Uses: Pumping service where loss of prime is possible.

Features: Patented recirculation-port design permits rapid priming and renewal of internal clearance.

Description: Pump line is offered in sizes ranging from 1½- to 8-inch suction and discharge. Units can be engine-



Recirculation port in centrifugal pump permits renewal of internal clearance

driven, close-coupled, monobloc motor driven, or conventionally coupled motor driven. All internal wearing parts are iron and steel. Smaller sizes are of aluminum for portability.

(PE self-priming centrifugal pumps are a product of Standard Pump Div. of Worthington Corp., East Orange, N.J.)

Check 1857 opposite last page.

Process equipment

Designer and fabricator of stainless steel and nickel alloy, carbon steel, and lined process equipment for chemical plants and other industries presents four-page brochure displaying typical examples of special equipment fabrication. Charts and equipment lists describe facilities which company can make available. Process industries product brochure — Kennedy Tank & Mfg. Co., Inc., 833 E. Sumner Ave., Indianapolis 27, Ind.

Check 1858 opposite last page.

Now...for every tube...every size...every type of job

WILSON TORQ-AIR-MATIC AUTOMATIC EXPANDER DRIVES



MODEL A
for Condensers
and Evaporators
¼" to 1¼" O.D.
(marine, power, air conditioning)
Light tube gauges—thin or
moderately thick tube sheets

**for
uniform
expanding
of
tubes**



MODEL B
for Heat Exchangers
¾" to 1½" O.D.
(oil refinery—chemical plants)
Small boiler; heavy
gauge tubes in thick sheets



MODEL C
for
Boiler Tubes
to 3" O.D.
(package and domestic)
2" and 2½" O.D. power plant
boiler tubes; re-boiler,
waste heat boilers, large
tube evaporators, etc.

Now WILSON offers a complete line of Torq-Air-Matic automatic tube expander controls. The Wilson Torq-Air-Matic is the first and only air driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel without depending on frictional, ratcheting, magnetic, hydraulic or electrical devices.

THOMAS C. WILSON, INC. 21-11 44th Ave., Long Island City 1, N. Y.

Branch Office: Land Title Building, Philadelphia 10, Pa.

Representatives in principal cities • Cable Address: "Tubeclean," New York

WILSON

TUBE CLEANERS • TUBE EXPANDERS

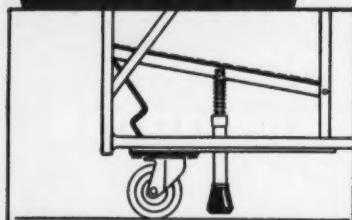
See how the exclusive design features of WILSON Torq-Air-Matic can help you expand tubes accurately and uniformly with considerable savings in time and manpower. Write for your Bulletin No. 581 which gives helpful data.



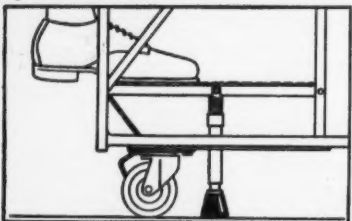
TW-887

Check 1859 opposite last page

**NEW
BALLYLOCK
MAKES
"Hi-boy" LADDERS
EASIER
TO USE!**



With Ballylock open, hinged first step is slightly raised . . . rubber-tipped legs are above floor. Ladder rolls easily and quickly from one job to another.



As user mounts ladder, first step lowers to normal position, the legs descend to grip the floor firmly, and a latch engages securely. To release, touch Ballylock with foot. No fumbling with tricky catches.

Ballylock "Hi-boy" Safety-Step Ladders equipped with a new locking device—the Ballylock—help make maintenance and repair jobs faster than ever. The new Ballylock works with amazing ease and is absolutely fool-proof.

"Hi-boy" Ladders are available in the new pyramid design from 8 to 12 steps for average work levels up to 15 ft.

Write for new Catalog describing the complete line of Ballymore equipment for above-floor working safety. The Ballymore Company, West Chester 10, Pa.

BALLYMORE
EQUIPMENT
FOR ABOVE-FLOOR
WORKING SAFETY



DISTRIBUTORS IN PRINCIPAL CITIES

Check 1860 opposite last page

ENGINEERING & SAFETY

**Short snort of O₂
for quick entry
into toxic area**

Uses: For respiratory protection in any toxic or oxygen-deficient atmosphere for a period of ten to fifteen minutes.

Features: Equipment can be put into operation in seconds. Weighing only 15 lb, it is designed to give maximum freedom of movement to the wearer.

Description: The "Short Snorter" is a lightweight, air-oxygen quick-entry mask. Equipment is for use principally in rescue work or for quick inspections in toxic atmospheres.

A full face mask is provided, the same size as that used in larger type apparatus. Efficient demand valve gives sufficient air or oxygen for wearer, with minimum breathing effort.

("Short Snorter" is product of Globe Industries, Inc., 125 Sunrise Pl., Dayton 7, Ohio.)

Check 1861 opposite last page.

**Develop leaded glove
for protection against
short wave radiation**

Reduces soft gamma rays by as much as 86%

Uses: For protection against short wave radiation.

Features: Material reduces soft gamma rays by as much as 86%, making possible high degree of safety in handling radioactive materials.

Description: Seamless, leaded neoprene glove has density of 3.95 grams per cubic centimeter. Gloves are available in variety of styles and thicknesses, from a 14" length up to a 32" length for dry-box work. Each 32" glove weighs more than four pounds, as compared to the slightly more than one pound weight of a conventional dry-box glove.

("Rad-Bar" gloves are product of Charleston Rubber Co., Stark Industrial Park, Charleston, S. C.)

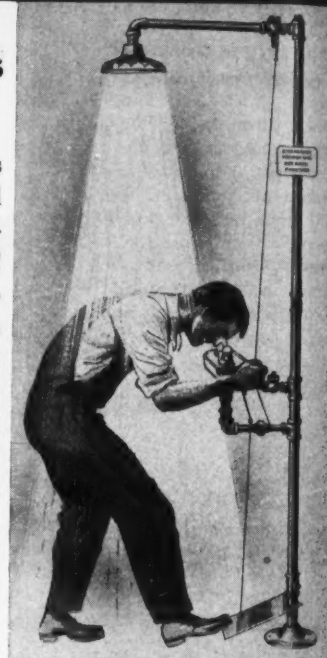
Check 1862 opposite last page.

HAWS DRENCH SHOWERS

**RID THE BODY OF
CAUSTICS and CHEMICALS
Instantly! Thoroughly!**

ACCIDENTS with caustic chemicals strike with shocking swiftness—and Haws Drench Showers are instantly ready to deliver relief just as fast! A solid downpour washes away destructive materials—saving seconds until medical aid arrives, possibly averting serious injury and excessive compensation claims. Haws Drench Showers can help you! Write for details and illustrated literature.

MODEL 8935—Drench shower augmented by Haws eye-wash fountain. A complete safety station—always ready!



HAWS

DRINKING FAUCET CO.

(Since 1909)

1443 FOURTH STREET • BERKELEY 10, CALIFORNIA

Check 1863 opposite last page

Hanson

Fiberglass Tanks

Custom-built

to your needs!



- Strong, lightweight!
- Will not rust or corrode!
- Any shape required!
- Sizes 50 to 5000-gallons!

For quotations—
Send us your requirements:

Hanson Equipment Company
Beloit, Wisconsin

Check 1864 opposite last page

CHEMICAL PROCESSING

**Safe handling of H_2O_2
given by gate valve
with one-side seal**

**Design prevents build-up
of dangerous pressure**

Uses: Gate valve is specifically designed for service handling hydrogen peroxide.

Features: Unit has seal on one side only, thus eliminating possibility of dangerous pressure build-up, through H_2O_2 decomposition, in the valve chest. Teflon seal, located on the wedge, can be quickly and easily replaced.

Description: Valve is being produced in aluminum or stainless steel in a wide range of sizes. Bore of body is machine finished to provide a clean, smooth fluid contacting surface. Wedge is micro-finished and seating surfaces precision machined to provide an exacting metal-to-metal fit.

(Model VCG15 H_2O_2 gate valve is a product of Hamer Valves, Inc., 2919 Gardenia Ave., Long Beach 1, Calif.)

Check 1865 opposite last page.



Steam and rotation . . .

. . . are handled with ease by this 4" flanged ball joint feeding steam to a spherical rotary digester at Otsego Paper Co., Otsego, Mich. Digester, under pressure, operates at a speed of about 1/5 rpm. Ball joint takes care of expansion of lines, eccentricity of rotation.

(Ball joint is a product of Barco Manufacturing Co., 500 N. Hough Street, Barrington, Illinois.)

Check 1866 opposite last page.

Simplicity in steam traps can effect big savings in parts inventory and maintenance time

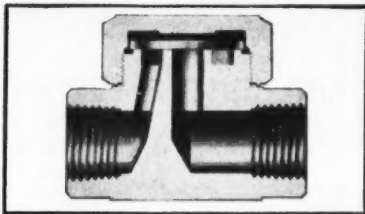
by John W. Ritter, Test Engineer
SARCO Company, Inc.

The function of all steam traps is to release condensate and prevent steam loss. However, the method of trapping can make a great difference in cost and effectiveness.

In the Sarco Thermo-Dynamic Steam Trap, the method is fundamental. Air or condensate entering the trap must flow from the inlet tube, radially across the underside of the disc valve, to the outlet. The space between the inlet tube and the disc forms a nozzle in which the static pressure energy of the incoming fluid is partly changed to velocity across the underside of the disc, with a resultant decrease in pressure. (This will be recognized, of course, as the Bernoulli Principle.) Use of this fundamental method means reliability in operation.

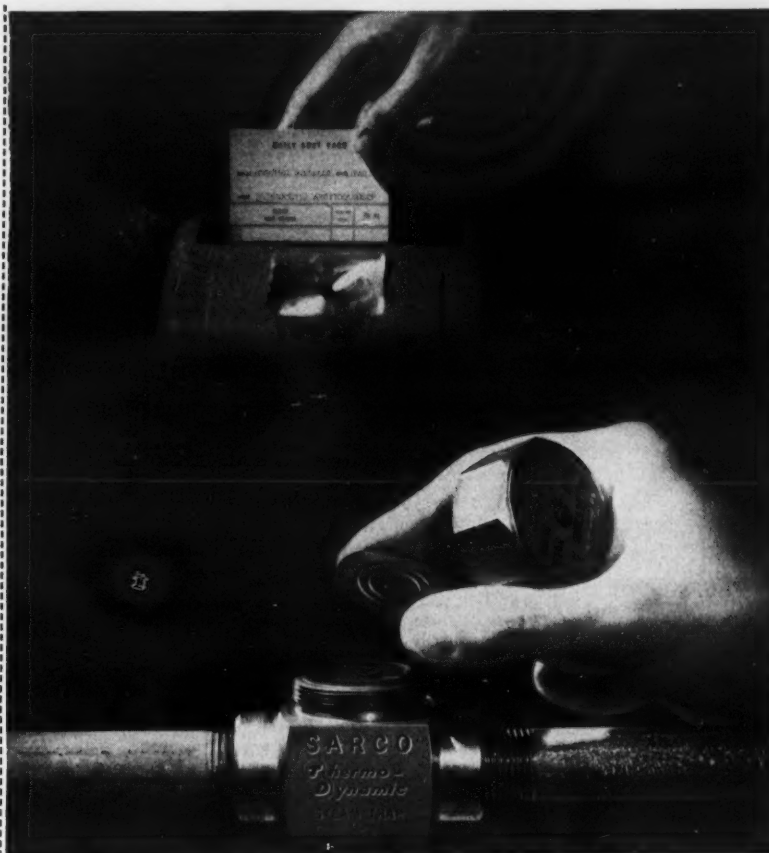
As the high velocity fluid jet strikes the side of the upper chamber, some recompression takes place, so that the pressure above the disc becomes greater than the pressure below it. The pressure reduction under the disc and the pressure recovery above it depend on the internal energy of the fluid. As the condensate above nearly approaches steam temperature, its internal energy is enough to overcome the upward force at the inlet tube and the disc snaps down in the inlet tube, which is the inlet valve seat.

Simultaneously, the disc also seals the outer ring, which isolates the space above the disc from the outlet. The disc valve is therefore held firmly against the inlet valve seat until the pressure in the control chamber is reduced by condensation. The upward force then exceeds the downward force and the disc valve opens.



This 3-part Sarco TD Steam Trap has only one moving part—the hardened, polished stainless steel disc.

No other trap uses the velocity of the fluid to operate the valve or uses the recompression of the flowing fluid to trap the valve closed and to hold it closed. When it closes, it closes tightly—no "operating steam" leaks out.



**40 seconds inspection time—
that's all it takes
for a SARCO TD Steam Trap**

Just back off the cap of a Sarco TD. Lift out its single moving part, the stainless steel disc. Wipe it off, and drop it back. No adjustment is ever required, at any load or any pressure in its range—from 10 through 600 psi.

The TD operates in any position, won't blow steam at any load. Small as a tee fitting, it can be installed in tight places. Its versatility and reliability cut cost of big replacement inventory.

Write for "Literature Kit 2A" today and get latest bulletins on the TD Steam Trap and other Sarco steam traps. Remember that Sarco can give you impartial advice on *Production Planned steam trapping* because . . .

5605-B

SARCO
COMPANY, INC.

635 Madison Ave., New York 22, N. Y.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

Only Sarco makes all 5 types:
Thermostatic • Liquid Expansion • Float Thermostatic
Thermo-Dynamic • Bucket

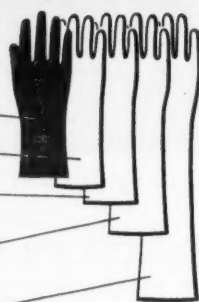
Check 1867 opposite last page



These Stanzoil® Milled Neoprene Gloves
Guarantee Positive Liquidproof Protection in
103 Basic Oils, Acids, Caustics, Greases, Solvents

Black All Neoprene Stanzoils With Non-slip Grip

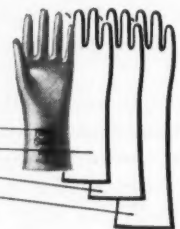
Model	Weight	Fingers	Length
N-31	Light	Straight	10½"
N-35	Light	Curved	10½"
N-32	Medium	Straight	11"
N-36	Medium	Curved	11"
N-41	Heavy	Straight	12"
N-44	Heavy	Curved	12"
N-51	Heavy	Straight	14"
N-33	Light	Straight	14"
N-54	Heavy	Curved	14"
N-71	Heavy	Straight	18"
N-73	Light	Straight	18"
N-74	Heavy	Curved	18"



White All Neoprene Stanzoils With Smooth Finish

Model	Weight	Fingers	Length
N-30	Light	Curved*	10½"
NW-31	Light	Straight	10½"
NW-32	Medium	Straight	11"
NW-41	Heavy	Straight	12"
NW-51	Heavy	Straight	14"

*Non-slip



Mail This Coupon Today

The PIONEER Rubber Co.
241 Tiffin Road . . . Willard, Ohio

Please send me:

- ☐ 1958-59 Pioneer Industrial Glove Catalog
☐ 17" x 22" Full Line Glove Wall Chart
☐ Job Description Form For Free Hand Protection Analysis

Firm.....

Address.....

City.....

Zone.....

State.....

Requested by.....

Check 1868 opposite last page

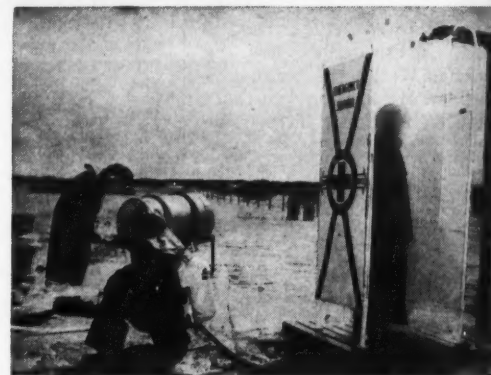
**PLANT ENGINEERING
MAINTENANCE & SAFETY**



Transferring red fuming nitric acid to spherical tank for transport to a Corporal missile. Note use of self-contained breathing unit by "standby" men. "Buddy system" is used for maximum personnel safety

Safety shower being used to wash contaminating fumes from protective suit after acid disposal operation. Even strongest concentrations are removed in seconds

Tremendous power needed to drive our rockets and missiles comes from fuels whose characteristics make them extreme safety hazards. Here is how Propellant Branch maintains . . .



Maximum personnel safety handling missile fuels at White Sands

THEODORE W. WETT, Associate Editor
with **L. V. FERNANDEZ**, Chief, Propellant Branch
Post Ordnance Division
White Sands Missile Range, New Mexico

Problem: More than 5 million pounds of highly explosive, corrosive, or toxic propellants were handled last year in the missile test program at White Sands Missile Range, N.M. A majority of propellant systems combine liquids and solids. Most common liquid fuels are aniline, ethyl alcohol, furfuryl alcohol, hydrazine and the hydrocarbons plus jet fuels, unsymmetrical dimethyl hydrazine (UDMH), and other experimental liquids. In addition, many liquid oxidizers are necessary for extreme altitude combus-

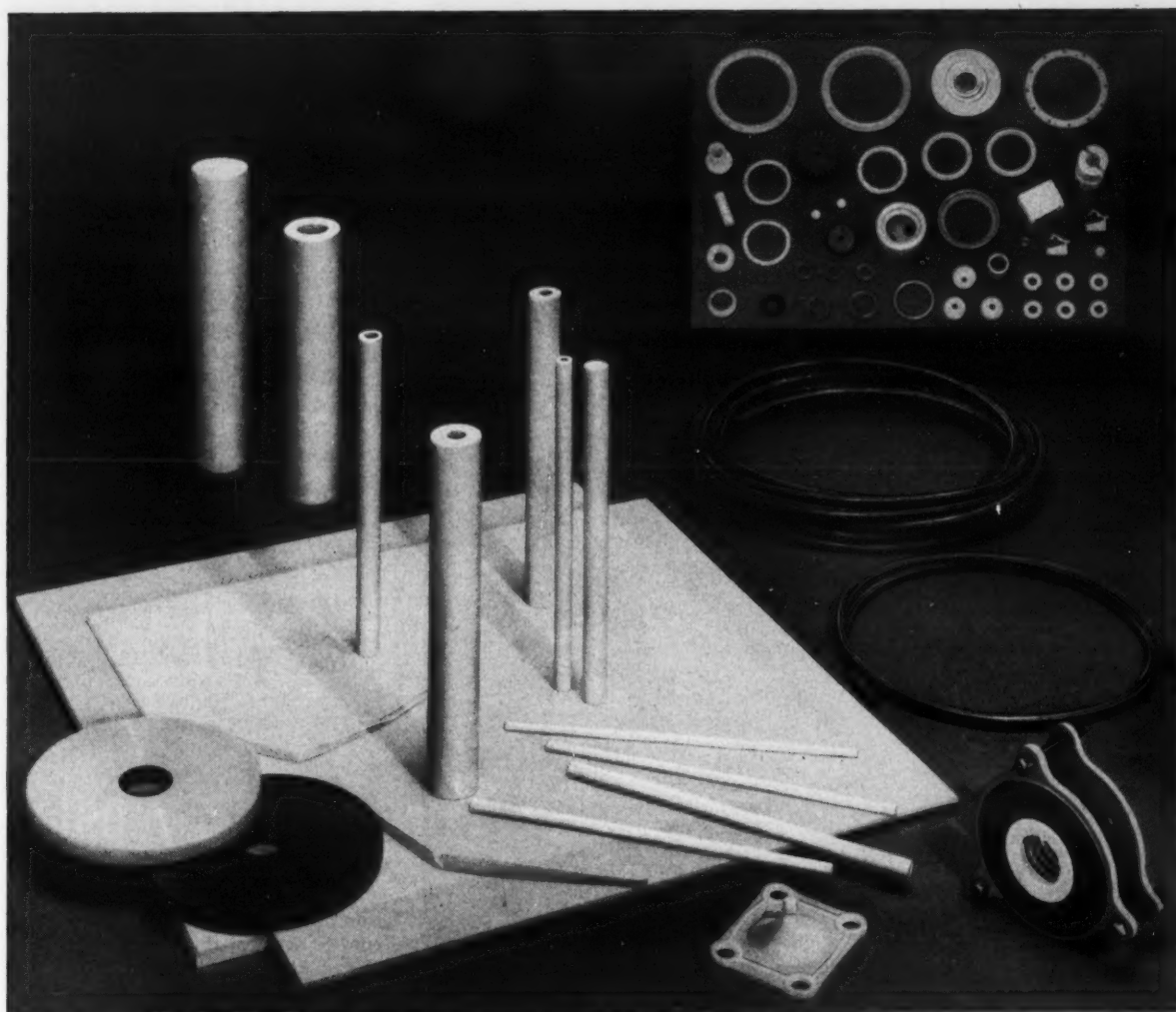
tion. These are primarily liquid oxygen and fuming nitric acids.

Even inhaled vapors from some of these liquids can produce toxic effects. Fainting, dizziness, drop in blood pressure, choking, nausea, vomiting, loss of consciousness — even death — can result with little or no warning. Others are highly corrosive or explosive. Some combine all three characteristics.

Prior to 1951, each missile project handled its own fueling operations. As testing program expanded and number of firings increased it became apparent that a separate organization with responsibility for all fueling operations was necessary from standpoint of safety and economy.

Propellant Branch was then formed consisting originally of four men. Em-

If you need TEFLON* in any form R/M is the place to get it!



Raybestos-Manhattan pioneered in research and development in the use of "Teflon." R/M has had vast experience in fabricating this amazing substance . . . has accomplished things with it once thought impossible, such as molding highly complex valve diaphragms.

But R/M has more than the know-how—it has the facilities to produce "Teflon" in exactly the form you want it . . . can supply *all* your needs, from the usual types of

tubes, tape, rods, sheets and flexible wire braid covered hose to complicated molded and machined parts.

That is why R/M should be your headquarters for all your needs in products made of "Teflon," from simple standardized parts to intricate components painstakingly customized to your specifications. Call on your nearest R/M district office for the cooperation you need. Or write for detailed information.

*A Du Pont trademark



RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.
BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 26 • DENVER 16 • DETROIT 2 • HOUSTON 1 • LOS ANGELES 58 • MINNEAPOLIS 16
NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3 • PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 1869 opposite last page

ployment is now 48 men who are charged with receiving, storing, transporting, and dispensing virtually all missile propellants used at White Sands.

An example of these propellants is aniline. It is flammable with an ignition temperature of 1418°F. It reacts with many organic materials, violently with strong acids. Aniline is toxic through inhalation of fumes, ingestion, or absorption through the skin.

It is a cumulative poison. More than five parts per million parts of air per day may produce chronic poisoning. Principal toxic hazard from aniline is liquid contact with the skin, through which it is readily absorbed.

Solution: Stringent safety regulations govern operations in all cases where propellant materials are handled. New employees receive intensive safety instruction and all attend periodic safety training sessions. The "buddy system," in which propellant handlers work in pairs with one watching while the other performs a hazardous operation, is used extensively.

For personal protection, suits of vinylite-covered cloth and self-contained breathing units are worn. Suits consist of bib overalls, coats with snap fasteners and zippers, gauntlet gloves, a hood with plastic face piece, and rubber or butyl boots.

Breathing units are of three types: Combat and industrial gas masks are used for open air handling. Units with a supply of pure air strapped on wearer's back serve in confined areas. One with its own supply of oxygen recirculated and purified repeatedly by a chemical system is also used for confined areas.

For further protection of operating personnel, safety showers have been installed in all buildings where fuels and oxidizers are handled or stored. These serve not only in case of accidental spillage or exposure but also as standard decontaminating units to

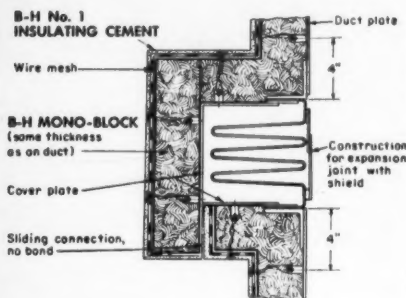
To page 183

One Block Insulation that gives you
Easier Handling, Faster Application...



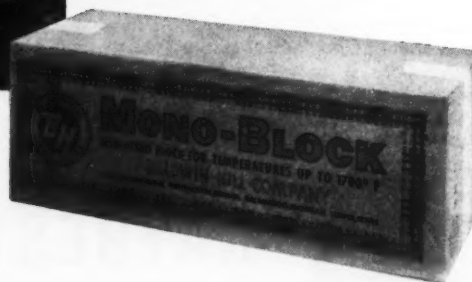
BALDWIN-HILL MONO-BLOCK®

Ducts and housings on two 560,000 lb. per hr. boilers, operated by a large Taconite producer in Minnesota, were insulated with B-H Mono-Block (effective to 1700° F) by simple, standardized methods which permitted minimum application cost. The light weight of Mono-Block as well as its ease of cutting holes for tie wires and shaping to conform to surface irregularities facilitated the special insulating treatment of duct flanges and stiffeners. For a finish coat, B-H No. 1 Insulating Cement was used.



Duct Expansion Joint

An interesting application of Mono-Block is on the expansion joints where movement will exceed 3". Block was applied to two independent sections capable of sliding with respect to each other.



For more information on B-H Mono-Block, B-H No. 1 Insulating Cement and other B-H Insulations, write for catalog or see it in Sweet's Plant Engineering File.

ENGINEERING & SAFETY

Dry chemical powder available in 2½-lb fire extinguisher

Uses: Unit is recommended for emergency vehicles, trucks, and light industry applications where on-the-spot protection is desired against incipient fires in gas, oil, paint, propane, chemicals, and electrical equipment.

Features: Dry chemical powder — an effective killer of both flammable liquid and electrical fires — is available in 2½-lb pressurized extinguisher.

Description: Depression of squeeze lever on this portable extinguisher spreads a 60"-wide blanket of non-freeze, non-toxic, non-conducting, dry chemical powder to a range of 12 ft. Chrome-plated case is both corrosion resistant and conspicuous for quick location in emergencies. Unit operates at a pressure of 150 psi, with pressure constantly indicated on a built-in gage. It has been tested to 450 psi without damage.

(Model 23-1 portable extinguisher is product of The Fyr-Fyter Co., 221 Crane St., Dayton 3, Ohio.)

Check 1871 opposite last page.



For more information on product at right, specify 1872... see information request blank opposite last page.

BALDWIN-HILL

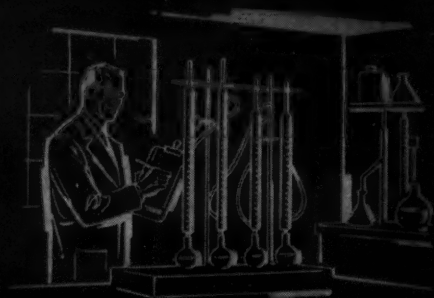


Company

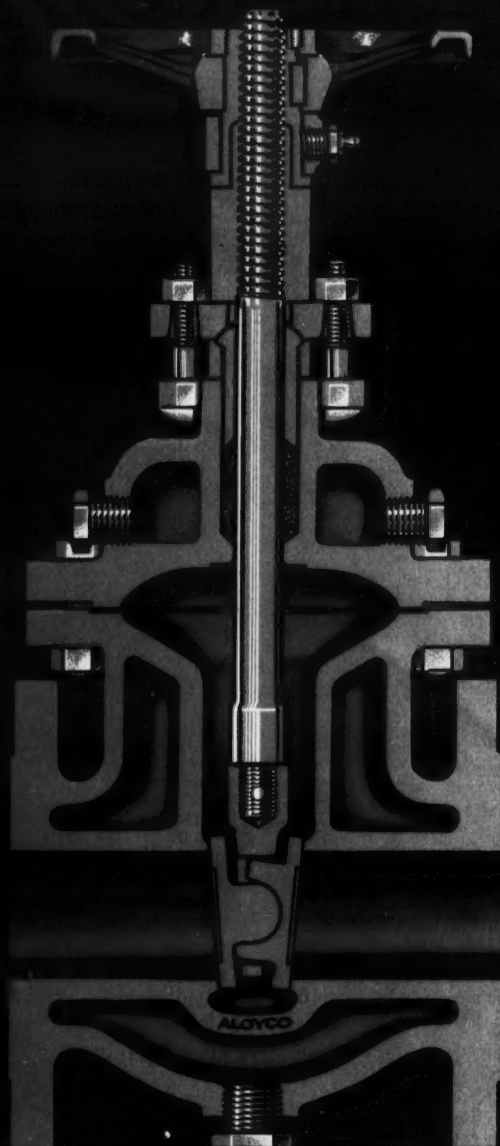
410 Breunig Ave., Trenton 2, N. J.

Kalamazoo, Mich. . . . Huntington, Ind. . . . Temple, Tex.

Check 1870 opposite last page



Thirty years'
research devoted
exclusively to...



STAINLESS STEEL VALVES

Aloyco's specialized research . . . in the field and in the lab . . . brings you a wealth of metallurgical information for successfully solving your corrosives handling problems.

Coupled with continuing research in design, foundry and machining techniques, this Aloyco specialization results in new and better corrosion resistant valves for many specific applications. One example above: Aloyco completely jacketed valves (the first ever to be integrally cast in high alloys) are designed for viscous liquids and other fluids difficult to move at room temperatures.

Isn't your surest source of supply the one company with research, manufacturing and sales all devoted to Stainless Steel Valves exclusively?



ALLOY STEEL PRODUCTS COMPANY
Linden, New Jersey



It will pay you to investigate

INFILCO Hot Process Lime-Soda Softeners

**for boiler
feedwater treatment**



INFILCO'S ADVANCED EQUIPMENT design for this familiar process provides superior treatment for intermediate pressure boilers, usually at lower overall cost than ion exchange.

No other *single* process gives you *all* these advantages:

1. Clarification
2. Softening
3. Solids Reduction
4. Alkalinity Reduction
5. Silica Reduction
6. Feedwater Heating
7. Deaeration
8. Continuous operation with inexpensive, safe chemicals

In equipment, as in results, INFILCO offers the quality you need...your choice of two custom-engineered designs:

1. ACCELATOR® HOT-FLOW® Softener. Internal recirculation by steam lift, independent of throughput rate, is an exclusive feature of this equipment and assures optimum solids contact for chemical efficiency at high and variable flow rates. Provides integral multi-pass deaeration by concurrent scrubbing action of steam.

2. "HOT-FLOW" Softener, slurry retention type Refinement of traditional method provides extended contact with reactive solids, clarifies treated water by upflow through suspended slurry pool. Especially applicable to low and reasonably constant flow rates. Separate INFILCO recirculating type deaerating heater assures lowest oxygen residual.

Complete systems by INFILCO may also include Condensate Deaerating Heaters, "INFILCARB" Filters, and CATEXER® Hot Zeolite Softeners.

Let the INFILCO engineer in your vicinity tell you more about this interesting equipment. Or write today for additional information and your copy of Bulletin 1855.

INFILCO Incorporated

General Offices • Tucson, Arizona • P.O. Box 5033

Field offices throughout the United States and in foreign countries.

58402



EMINENCE IN ENGINEERING DESIGN OF WATER, SEWAGE & WASTE TREATING EQUIPMENT... SINCE 1894
Check 1873 opposite last page

From page 181

prevent exposure.

Shower stalls are open on two sides for easy access. Each stall has 12 nozzles, four above the head, four at chest or waist level, and four below knee level. An operator who has been splashed with a dangerous liquid or contaminated with toxic fumes may enter quickly, even in bulky protective clothing, and douse himself completely. In seconds, drenching water will dilute and wash off strongest concentrations of toxic liquids or vapors. Eighteen of these showers have been set up in strategic locations.

In addition, neutralizing solutions are maintained. Alkaline solutions are used for oxidizers and acetic acid for aniline contamination.

Electrical wiring and equipment throughout plant is explosion proof. Handling of volatile and toxic fluids by hand is kept to a minimum. Fire-fighting equipment is maintained at handy sites throughout the areas.

Setup for red fuming nitric acid is typical. It has four storage tanks with capacity of 5000 gal each and two remotely operated 50-gpm pumps. An automatic alarm system prevents overfilling. Three safety showers and an overhead sprinkler system complete the installation.

Results: Plant is as complete and safe as it can be made in light of present knowledge. Protective clothing, breathing units, and showers serve to maintain maximum safety for individual employees.

Despite highly toxic nature and large quantities of materials handled, stringent safety measures and intelligent use of safety equipment have kept injury rate to a minimum.

(Showers are supplied by Logan Emergency Showers, Inc., PO Box 111, Glendale, Calif.)

Check 1874 opposite last page.

(For more information on self-contained breathing units contact Scott Aviation Corp., 211 Erie Street, Lancaster, New York.)

Check 1875 opposite last page.

News and Notes on...

Good Packing Practice



Maintenance and Design Hints from Johns-Manville Packings and Textiles Dept.

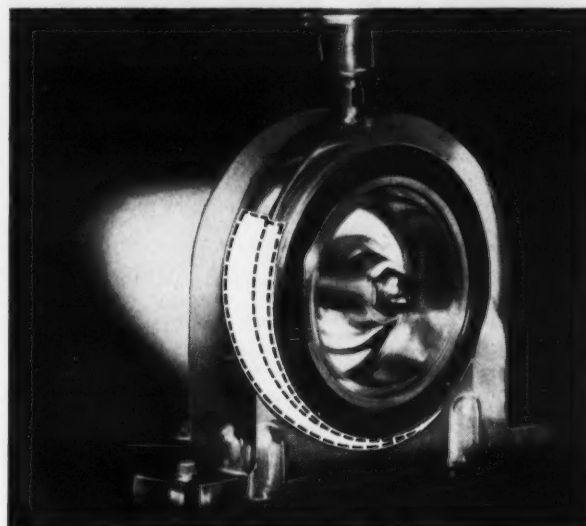
Subject of the month: Effective Shaft Sealing

Question: What is an economical way to seal in or seal out with maximum efficiency?

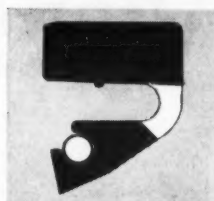
Whether the shaft bearing is of the sleeve, roller, or ball type . . . seals should meet two basic requirements: (1) provide a tight seal despite light applied pressure, and (2) resist abrasion and corrosion.

The transparent unit shown at the right was created by research engineers to study this subject of effective sealing . . . witness the performance of J-M seals in development stages. It helped them perfect the versatile, dependable line of J-M Clipper® Seals that serve many industries.

In this unit, Clipper Seals are mounted on a transparent cylinder, just as in a bearing cavity. The heel of the seal provides the rigidity essential for a press fit. The lip is flexible and soft so as to snug the shaft with a minimum of friction. Thus it acts like a gasket and effectively stops leakage.



HERE ARE JOB-TESTED RECOMMENDATIONS FOR COMMON SEALING APPLICATIONS:



For General Service—Type LPD All Purpose. This line-contact Clipper Seal provides long life and maximum sealing effectiveness under a wide range of equipment variables. Its synthetic rubber base compound is recommended by J-M for most

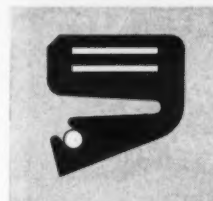
sealing lip applications where combined ambient and operating temperatures reach 250°F and higher. It seals practically all fluids . . . has proved highly effective against oils and greases, hot and cold water, air and many other gases and vapors. And it maintains its high efficiency despite time, high temperatures, and adverse conditions.



For Small Clearances—Split Clipper Seals. Split Clipper Seals have wide acceptance as temporary replacement seals for equipment with space or design limitations . . . to save costly downtime. Installation in inaccessible space is relatively simple and speedy. They are practically

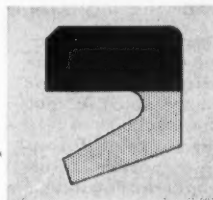
fracture-proof . . . stand up under the rough treatment . . . can be forced into position around the shaft. They give long-term, efficient sealing until a major overhaul permits replacement with solid seals.

For further data on Clipper Seals write for Book PK-71A. Address: Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario.



For Continuous High Speed Operations—Type LPD Metal-Reinforced. This Clipper Seal, incorporating a metal reinforcement, is ideal for use in continuous high speed and extremely abusive service such as encountered in the steel industry. It expands and contracts with the

chuck in which it is installed. It is a combination of two synthetic rubber base materials that are highly resistant to cracking, hardening and shrinking.



For Small Shaft Diameters—Type SS Springless. Here's the Clipper Seal designed for smaller cavities. It is made of a selected synthetic rubber base compounded to minimize swell and deterioration in corrosive applications where chlorinated solvents, lubricating oils carrying

severe additives, or similar aggressive fluids must be sealed. It is a complete part in itself—contains no metal spring. No spring is required because this seal is designed to exert sufficient lip interference on the shaft to compensate for wear over a long period of time.

JOHNS-MANVILLE
100 YEARS OF QUALITY PRODUCTS . . . 1858-1958

Check 1876 opposite last page



**Longer Wear
in every pair
and SAFER, too!**

SEIBERLING

**FIRM
GRIP**

INDUSTRIAL GLOVES

- Patented embossed NON-SLIP safety grip moulded into fingers and palm.
- Curved fingers for more comfort and better fit.
- Tough and durable... last longer, look better.

Natural Rubber or Neoprene Latex

**SEND FOR
CATALOG No. G 3**
of Seiberling's complete
Industrial Glove Line!

**Seiberling
LATEX PRODUCTS**
New Bremen, Ohio

Check 1877 opposite last page

BETTER PERFORMANCE

- *Less slippage*
- *Longer life*



Try **Darcova Puncups** in your reciprocating pumps and cylinders, and you too will realize what a *big* difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Get all the facts
Send today for helpful Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

TRADE MARK
Puncups

Check 1878 opposite last page

ENGINEERING & SAFETY

One-hand operation possible with coupling

Interchangeability permits
easy change making

Uses: Coupling meets Military Specification MIL C-4109A. It is designed for working pressures up to 10,000 psi.

Features: Coupling locks automatically, without turning or twisting. It can be connected with one hand. Interchangeability with other make couplings, permits possible replacement of coupling sockets or plugs with minimum expenditure.

Description: Units are available in various style end connections in sizes 1/4, 3/8, 1/2, and 3/4". Full 360° swivel action eliminates hose kinking.

(D series interchangeable couplings are a product of Breco Div., Perfecting Service Company, 332 Atando Ave., Charlotte 6, N. C.)

Check 1879 opposite last page.

Can be read at test site —gas detector designed to avoid lab analysis

Chemical additives unnecessary

Uses: For tracing and determining gas concentrations.

Features: Unit is designed to take semi-quantitative gas estimations which can be read at site of test. Chemical additives are not necessary.

Description: Gas detector tube is inserted in hand pump and a gas sample is forced through a uniform amount of reagent. While counting suction strokes of pump, operator observes color of tube which indicates concentration of gas. Indication may be read either from detector tube directly or from corresponding table.

(Drager gas detector and detector tubes are available from Union Industrial Equipment Corp., 20 Davis Ave., White Plains, N.Y.)

Check 1880 opposite last page.

conax® PACKING GLANDS USING "SOFT" SEALANTS



CONAX Packing Glands compress the "soft" sealant against any kind of tube, rod or wire with the following advantages:—

- Temperature range: —300°F to +1850°F
- Pressure range: vacuum to 7500 psi.
- Non-destructive to sealed element
- Completely adjustable immersion
- Stainless steel construction
- Available "soft" sealants: Neoprene, Teflon, Lava and Asbestos-Graphite
- Delivery from stock



**WRITE FOR CONAX DATA
BOOK SHOWING COMPLETE
LINE OF THERMO-
COUPLE ASSEMBLIES AND
PRESSURE SEALING
GLANDS**

conax

corporation

2314 Walden Ave., Buffalo 25, N. Y.

Check 1881 opposite last page

VIBROLATOR
"WORLD'S QUIETEST VIBRATORS"
MOVES MATERIALS

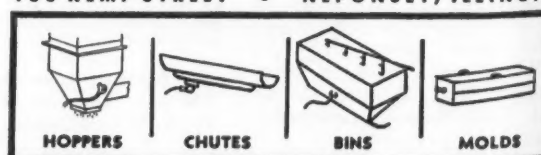


This vibration inducer has only one moving part — a rolling ball. Works perfectly on wet or dirty air. Need no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

The Vibrolator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

Available in 14 sizes, priced from \$12 to \$150. "pocket-watch" size to new 28 lb. UCV-54, shown here. Never harms equipment on which it is mounted. Write for catalog today.

MARTIN ENGINEERING COMPANY
155 KEMP STREET • NEPONSET, ILLINOIS



Check 1882 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

Dog's life?

Dogs don't even have to bark for their meals since invention of an automatic pet feeder that's really the cat's meow. Portable self-contained kennel has circular, divided food tray, water bottle, and dry ice to refrigerate the repast. Timer is set to serve one portion every 12 hr. Water, of course, is available at all times. (D&O News, Dodge & Olcott, Inc.)

Large charge

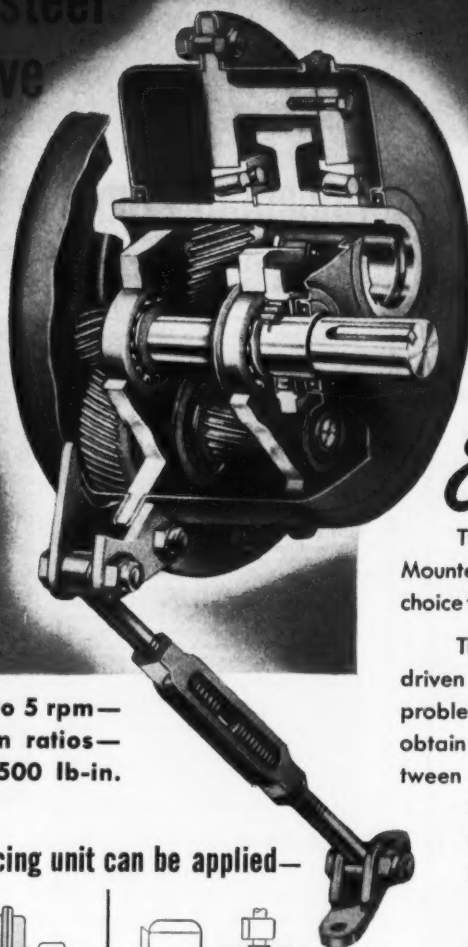
Big hydro-electric development, Niagara Power Project, will turn out enough electricity to supply household needs of city the size of Chicago (pop. 3,621,000).

Water tumbling over Falls will be harnessed to generate 216,000 more kilowatts than Grand Coulee Dam, free world's number 1 producer of hydro-electric power. (Black Horse News, Merritt-Chapman & Scott Corp.)

For more information on product at right, specify 1883 see information request blank opposite last page.

The **FALK** all-steel Shaft Mounted Drive

- **Versatile**
- **Efficient**
- **Economical**
- **Compact**



*To
Plant
Engineers:*

The versatility of the Falk Shaft Mounted Drive makes it the practical choice for many machines in your plant.

This compact unit mounts on the driven shaft, thereby solving many problems of restricted space. You can obtain almost any output speed between 420 and 5 rpm by selecting the proper single or double reduction unit and the proper sheave or sprocket ratio.

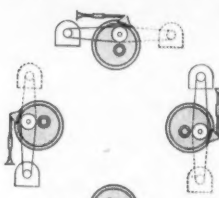
Do you need both horizontal and vertical drives? Standard Falk Shaft Mounted Drives are available for either application; or you can easily convert a horizontal unit to a vertical unit, right in your plant. Initial cost is low, you get immediate delivery from shelf stock, and installation is quick and easy.

★

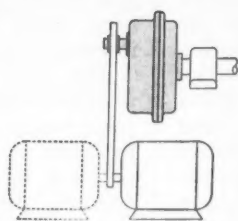
FALK Shaft Mounted Drives are available from factory and distributor stocks from coast to coast. See your Falk Representative or Distributor—or write direct for your copy of Bulletin 7100.

**SEVEN SIZES— $\frac{1}{2}$ to 50 HP—420 to 5 rpm—
single and two double reduction ratios—
output torque ratings up to 31,500 lb-in.**

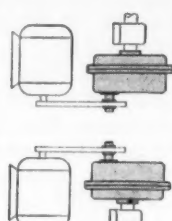
A few of the many ways this reducing unit can be applied—



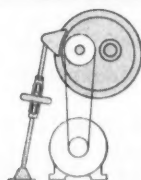
ANY POSITION



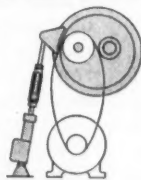
MOTOR EXTENDED
—or below the unit



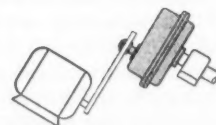
VERTICAL—UP or DOWN



VARIABLE SPEEDS...
through use of variable-pitch sheaves—automatic belt adjustment with tie-rod adjustment



OVERLOAD RELEASE...
that will slacken belts and cut off power if overload occurs



INCLINED SHAFT...
Any standard unit can be mounted in vertical or inclined position by a simple rearrangement of oil drains

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

Manufacturers of

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK
...a good name in industry

VANTON *notes on fluid handling*

PUMPS • PIPE • FITTINGS • VALVES

Is Your Fluid Handling Problem Here?

If so, Vanton pumps have been handling it for years with eminent success.

PROBLEM LIQUID	RECOMMENDED MATERIALS* (Body Block & Flex-i-liner)
Acetic Acid	Buna N & Hypalon
Aluminum Chloride	Polyeth. & Nat. Rubber
Ammonia	Polyeth. & Neoprene
Chromic Acid	Polyeth. & Hypalon
Developer Solution	Polyeth. & Neoprene
Distilled Water	Polyeth. & Buna N
Ferric Chloride	Polyeth. & Nat. Rubber
Hydrochloric Acid	Polyeth. & Hypalon
Hydrofluoric Acid	Polyeth. & Hypalon
Hydrogen Peroxide	Teflon & Hypalon
Lime Slurry	Buna N & Neoprene
Methanol	Bakelite & Neoprene
Nitric Acid	Teflon & Kel-F
Phosphoric Acid	PVC & Neoprene
Pickling Bath (H ₂ SO ₄ -HNO ₃ -HF)	Polyeth. & Hypalon
Plating Solutions (Cu, Ni, Ag, Zn)	Polyeth. & Neoprene
(Chromic)	Polyeth. & Hypalon
Sodium Chloride	Polyeth. & Nat. Rubber
Sodium Hydroxide	Polyeth. & Neoprene
Sodium Hypochlorite	Polyeth. & Hypalon
Sulfuric Acid	Polyeth. & Hypalon
Tile Glaze Slurry	Buna N & Nat. Rubber
Titanium Tetrachl.	Teflon & Kel-F
Zinc Chloride	Polyeth. & Hypalon

* In many cases alternative materials of construction are suitable. For complete chemical resistance data, and further information, circle #902.

Vanton Pump & Equipment Corp. Hillside, N. J.

Please send booklet circled: 901 902

My problem liquid is _____

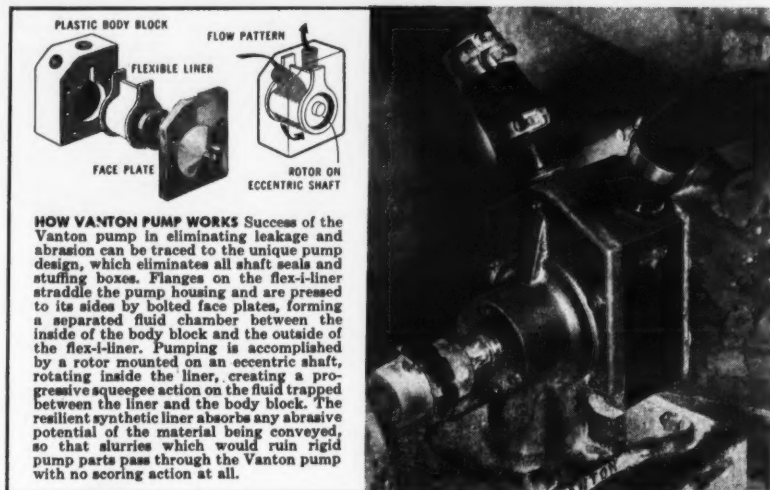
NAME _____

TITLE _____

FIRM _____

ADDRESS _____

Problem of Pumping Abrasive Cement Additive Solved by Plastic Sealless Pump



HOW VANTON PUMP WORKS Success of the Vanton pump in eliminating leakage and abrasion can be traced to the unique pump design, which eliminates all shaft seals and stuffing boxes. Flanges on the flex-i-liner straddle the pump housing and are pressed to its sides by bolted face plates, forming a separated fluid chamber between the inside of the body block and the outside of the flex-i-liner. Pumping is accomplished by a rotor mounted on an eccentric shaft, rotating inside the liner, creating a progressive squeegee action on the fluid trapped between the liner and the body block. The resilient synthetic liner absorbs any abrasive potential of the material being conveyed, so that slurries which would ruin rigid pump parts pass through the Vanton pump with no scoring action at all.

Diatomaceous earth can be highly abrasive in slurry form, and ruinous to any conventional pump called upon to handle it. That was the problem faced by H. S. Mensing Co., of FINDERNE, N. J., manufacturers of cement for building and road construction. They had found that a diatomaceous earth additive blended with the cement keeps the mix aerated longer and produces a stronger, harder, smoother set.

Attempts to produce large quantities of the improved product, however, were hampered by unexpected handling problems. The 63% diatomaceous earth slurry, which tended to settle rapidly, caused conventional pumps to malfunction and require constant dismantling and maintenance. Repair and replacement of impellers and scored pump shafts was excessive, with constant leakage. Various conventional-design pumps were tried out, but all proved unable

to operate for more than short periods of time without excessive maintenance, parts replacement, and costly production interruptions.

The installation of a Vanton plastic sealless pump, Mensing reports, solved all these problems for good. Settling is no longer a problem, and the soft flex-i-liner absorbs abrasive action of the slurry. In over 2 years of daily operation since installation, the Vanton pump is still going strong, 6 days per week. In these months of continual operation, the only maintenance required has been the replacement of one inexpensive flex-i-liner.

Vanton pumps are available in a wide range of plastic and synthetic materials, including DuPont Teflon, high-temperature polyethylene, PVC, and bakelite. Capacities range from 1/3 to 40 GPM. For more information, circle #901.



VANTON PUMP
and Equipment Corp. • Hillside, N. J.

DIVISION OF COOPER ALLOY CORP.

Check 1884 opposite last page

ENGINEERING & SAFETY

Developed new approach in lubricating Teflon seals, packings

Fluoro-oils show interesting and practical possibilities

Tests using fluoro-oils as lubricants on high-speed Teflon-metal interfaces have led to observations that are interesting and practical. Very small amounts of these oils adhere tenaciously to fluoro-plastic and give long term lubrication.

In one application a centrifugal pump was handling dimethyl sulfate. Numerous packings were tried to obtain a dripless gland seal without success. Dimethyl sulfate used in the manufacture of optical brighteners is exceedingly toxic, with the tolerable concentration in air at very small limits.

This problem was solved by two sets of Teflon chevron packings, separated by a lantern ring, through which 11-14 medium viscosity fluoro-oil was introduced under pressure. The pump operated cool for many months without any leakage of dimethyl sulfate. There was a very small and controlled leakage of fluoro-oil inward, but this amount of inert material was without defect as a contaminant.

(Further information on Halocarbon fluoro-oils in lubricating Teflon seals and packings may be obtained from Halocarbon Products Corporation, Hackensack, N.J.)

Check 1885 opposite last page.

Air power for safety in centrifugal for rocket fuels

Unit's design eliminates explosion danger

Completely safe processing of highly explosive missile and rocket propellants is fostered by a pneumatic-control, air-turbine-drive centrifugal at the Redstone Arsenal, Huntsville, Ala. Automatic unit, designed and fabricated for Rohm & Haas Company, is free of electrical components in either

FEEDER

OF THE

future

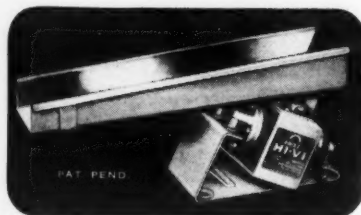
HERE NOW!

electro-permanent magnetic

ERIEZ

HI-VI

VIBRATORY FEEDER



Award-winning feeder... features new concepts in design and use of materials. Priced right; provides superior performance; lower operating costs; reduced maintenance and greater production output! For automatic, accurate feeding of all types of bulk materials. Variable feed rate from ounces to tons... performs spreading, aerating, cooling, proportioning, screening, other operations.

NEW A.C. ELECTRO-PERMANENT MAGNETIC DRIVE PROVIDES GREATER FEEDING CAPACITY • NO RECTIFIER NEEDED • FULLY ENCLOSED POWER ELEMENT PROTECTED AGAINST DUST AND MOISTURE • RUGGED GLASS FIBER SPRINGS REDUCE BREAKAGE • FULLY PROVED IN PLANTS EVERYWHERE

ALSO AVAILABLE: Economical, specially constructed units for hazardous, dusty locations... fully acceptable by Mill Mutual.

WRITE FOR BIG VIBRATORY FACT FILE
Eriez Mfg. Co., 73-KC Magnet Dr., Erie, Pa.



Check 1886 opposite last page

OCTOBER 1958

drive or control. Entire construction is designed to be static dissipating to eliminate any danger of explosion.

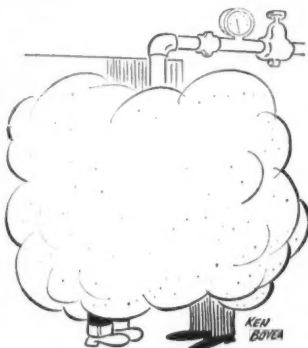
Unit is a bottom discharge machine with a perforated 20-inch basket which can produce one cubic foot of solid missile propellant per cycle. Top speed is 1500 rpm.

Only a compressor is required for operation (90-100 psi, 2-3 cu ft/min). Air enters console panel and is distributed and metered to various components. Brakes, unloader, speed control and other functions are pneumatically operated including automatic safety interlock which brings unit to an emergency stop if there is a loss of air anywhere in system.

Basket, shaft, and casing are 316 stainless. Basket valve, unloader, and shoe are made of non-sparking bronze. Tachometer drive shaft is stainless with bronze casing. Machine is 8'6" high overall. Panel is 3 x 4 x 5'.

(For more information on Fletcher Rocket air-powered centrifugal contact The Fletcher Works, Inc., 201 Glenwood Ave., Philadelphia 40, Pennsylvania.)

Check 1887 opposite last page.



"Bleacher, what's this complaint of yours about too much dust while charging your kettle?"

Our thanks for this one goes to Ken Boyea of Hercules Powder Co., Holyoke, Mass.

ENGINEERING & SAFETY

Convert installed valves to motor operation by low-cost unit

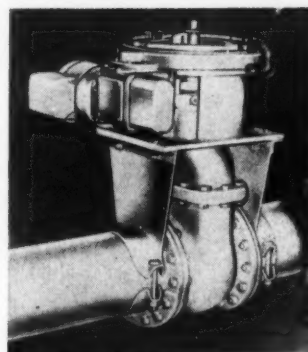
Completely safe operation; push-button control

Uses: For converting valves from hand operation to electric motor operation.

Features: Unit provides low-cost valve conversion without necessity of removing valve from line.

Description: Push-button-operated valve actuating conversion unit operates with complete safety. It can be installed without special engineering, or disturbing piping, or replacing existing valves.

Normal installation consists of six steps which can be performed with ordinary tools. Unit can be used in nearly



Adaptor brackets and plate are mounted to pipe. Motor and actuating mechanism are bolted to plate

every application where valve handle does not rise, and where handle can rotate when valve is operating under power. In event of power failure, valve can be restored to manual operation simply by removing two pins.

Position and torque limits are provided in both directions of rotation to prevent valve injury. Unit can be moved from one valve to another, and no special wiring is needed.

(Valvmatic is manufactured by C. H. Wheeler Mfg. Company, 19th and Lehigh Ave., Philadelphia 32, Pa.)

Check 1888 opposite last page.

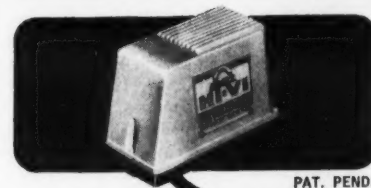
UNSTICK stuck BINS

with new
electro-permanent magnetic

ERIEZ

HI-VI

VIBRATORS



PAT. PEND.

Here's the newest and most efficient answer to those hard-to-move materials in sticky bins... designed to provide superior operating efficiency... exclusive pinpointed vibration gets right to the trouble spot - starts stubborn materials moving!

NO RECTIFIER NEEDED • COMPLETELY ENCLOSED HOUSING • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • RUGGED AND DURABLE • LOW FIRST COST • LOW OPERATING AND MAINTENANCE COST • Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS

GET THE WHOLE STORY... WRITE TODAY
Eriez Mfg. Co., 73KB Magnet Dr., Erie, Pa.



Check 1889 opposite last page

187

PROVEN

by the
acid test

**SURETY
SURESEAL
GLOVES**



Wherever chemicals, solvents, oils and other corrosive materials are handled—they can be handled better, faster and safer with SURETY Sureseal Gloves. Proper health safeguards increase employee morale and maintain worker confidence at a high level. Tangible results are also achieved in higher production and lower operating costs.

Proven under the most rugged conditions, Sureseal (made from Hycar) affords maximum protection against crippling injuries and disfiguring skin diseases, providing the greatest positive resistance to the largest number of acids and other caustic liquids. Sureseal wears up to 14 times longer than rubber and other synthetics and they are four to eight times more snag, abrasion and puncture-proof. The exclusive Turn-Cuff design provides additional protection by keeping liquids away from arms and inside of gloves.

Test a pair of Sureseals in your own shop—and at our expense! To get your free test gloves simply fill in the coupon and mail.

THE **SURETY**

RUBBER CO., Carrollton, Ohio

Gentlemen:
We're interested in testing Sureseal gloves.
Send sample and information to:

Name _____
Company _____
Address _____
City _____ State _____
Glove Jobber _____
Glove Use _____

Check 1890 opposite last page

ENGINEERING & SAFETY

**Pump direct from drum
with air-driven unit
for semi-fluids**

Can move heaviest products
from original container

Uses: Transfer of vinyls, adhesives, mastics, paints, similar semi-fluid materials.

Features: Air-powered pump will move heaviest, most viscous semi-fluids from original 55-gal drum. Large valve openings and large area piston combine for high volume delivery of all fluids from light to heavy.

Description: Unit is spark free, cannot burn out. It starts and stops delivery when operator opens or closes spigot or valve at point of dispensing. Reciprocating, double-action air motor minimizes pulsation.

(Bulldog air-powered pump is a product of the Gray Company, Inc., 1000 Sibley St., N.E., Minneapolis 13, Minn.)

Check 1891 opposite last page.

**No cold flow at 140°F
with roof coating**

Glass fibers stop movement
of asphalt cover

Uses: Roof coating for new or old surfaces. It can be used over felt, composition, tin and corrugated iron, concrete, and built-up roofs.

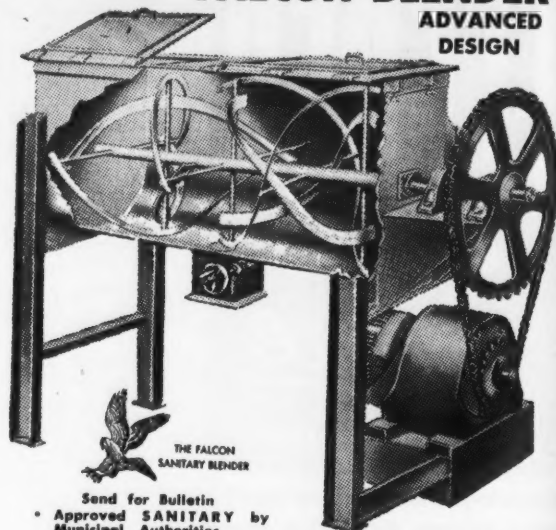
Features: Glass fibers in coating prevent cold flow. There is no sagging or pulling away from high spots at temperatures up to 140°F. Because flow is prevented, oxidation of more than the thin top layer is stopped.

Description: Asphalt material is formulated with plasticizers and waterproofing oils. Long fiber asbestos further increases wear and weather resistance. It can be applied in wet weather. A penetrating sealer cuts through surface moisture and forms a firm bond.

(Fibre Glass Supercote roof coating is a product of The Garland Co., Cleveland 5, Ohio.)

Check 1892 opposite last page.

The NEWEST **FALCON BLENDER** ADVANCED DESIGN



- Send for Bulletin
- Approved **SANITARY** by Municipal Authorities
 - Unique Double Ribbon For Faster efficient Mixing
 - All Sizes usually in Stock in Stainless or Mild Steel
 - Requires Less Power per load
 - Smooth Rounded Interior No projections to retain material

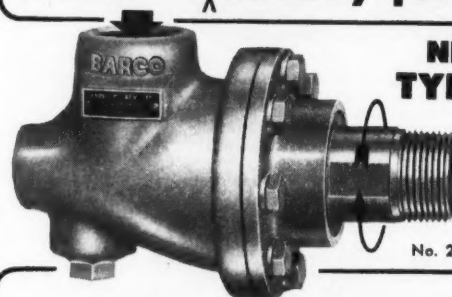
- Ribbon Assembly quickly removable for cleaning
- Jackets Available for Heating or Cooling
- The **FALCON** is competitively priced

STAINLESS KETTLES, REACTORS, TANKS

The **FALCON** MANUFACTURING
DIVISION OF

The **FIRST MACHINERY CORP.**
211 TENTH ST., BROOKLYN 15, N.Y. ST. 8-4672
Check 1893 opposite last page

Better
Need a rotary joint?



**NEW
TYPE C**

Patent
No. 2,836,439

-it's BARCO!

For countless applications, Barco's new Type C Rotary Joint will give you the best operating records you've ever had—and for **LESS COST!**

"CRACK-FREE" CHROME PLATED SLEEVE—A standard Barco feature. Minimizes corrosion, friction, wear. Stainless steel spring also standard.

RESISTS SEAL RING BREAKAGE—The spherical seal ring is under compression, not tension, loading. Self-adjusting for wear. Seal withstands shock loads and alternating hot and cold service.

WIDE SPACED BEARINGS—Two, instead of one... increased bearing area. No lubrication required. Lowest friction.

200 P. S. I. STEAM RATING—Heavy duty service at no extra cost. Eight sizes, 1/2" to 3". Send for new Catalog 310 today. **BARCO MANUFACTURING CO., 537L Hough Street, Barrington, Illinois.**

Check 1894 opposite last page

CHEMICAL PROCESSING

**Insulation holds acids
except HF, hot H_3PO_4
in any concentration**

Can be used from -450°F
to $+2200^\circ\text{F}$

Uses: Continuous insulating protection within range of -450 to 2200°F . For lining inside tanks and pipe lines that contain hot acids of any concentration.

Features: Insulation is unaffected by all acids, with exception of hydrofluoric and hot



Insulation is not affected by acids, except hydrofluoric and hot phosphoric, in any conc

phosphoric. It has a low coefficient of expansion (3.5×10^{-7}) and is light weight (10 to 12 lb/cu ft).

Description: Foamsil insulation is 99% pure fused silica with a compressive strength of 130 to 210 lb/sq in.

**Thermal conductivity, K
(BTU/sq ft/hr/ $^\circ\text{F}$ /in)**

@ 100°F	0.48
@ 500°F	1.0
@ 900°F	1.85

Material is supplied in rigid block of cellular structure $11'' \times 17''$ or $17'' \times 22''$ in thicknesses to $3''$. Curved segments, fitting covers, and other shapes are also available.

(Foamsil insulation is a product of Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 22, Pa.)

Check 1895 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

BULLETIN!

POWELL introduces new member in world's largest family of valves

Powell engineered "Full Flow" bronze valves are now available in a full line: the brand-new 150-pound screwed end Globe Valve, in addition to the well-known 200-300 pound Screwed and the 150-300 pound Flanged Globe and Angle Valves.

Although designed by Powell to assure maximum flow with minimum pressure

drop and internal turbulence, these valves can be throttled to permit only the minutest amount of fluid to pass through. And, if desired, they can be supplied with Indicator Collar, Arm and V-port Disc for quickly determining flow and holding it constant.

Compare these advantages of Powell Full Flow valves:

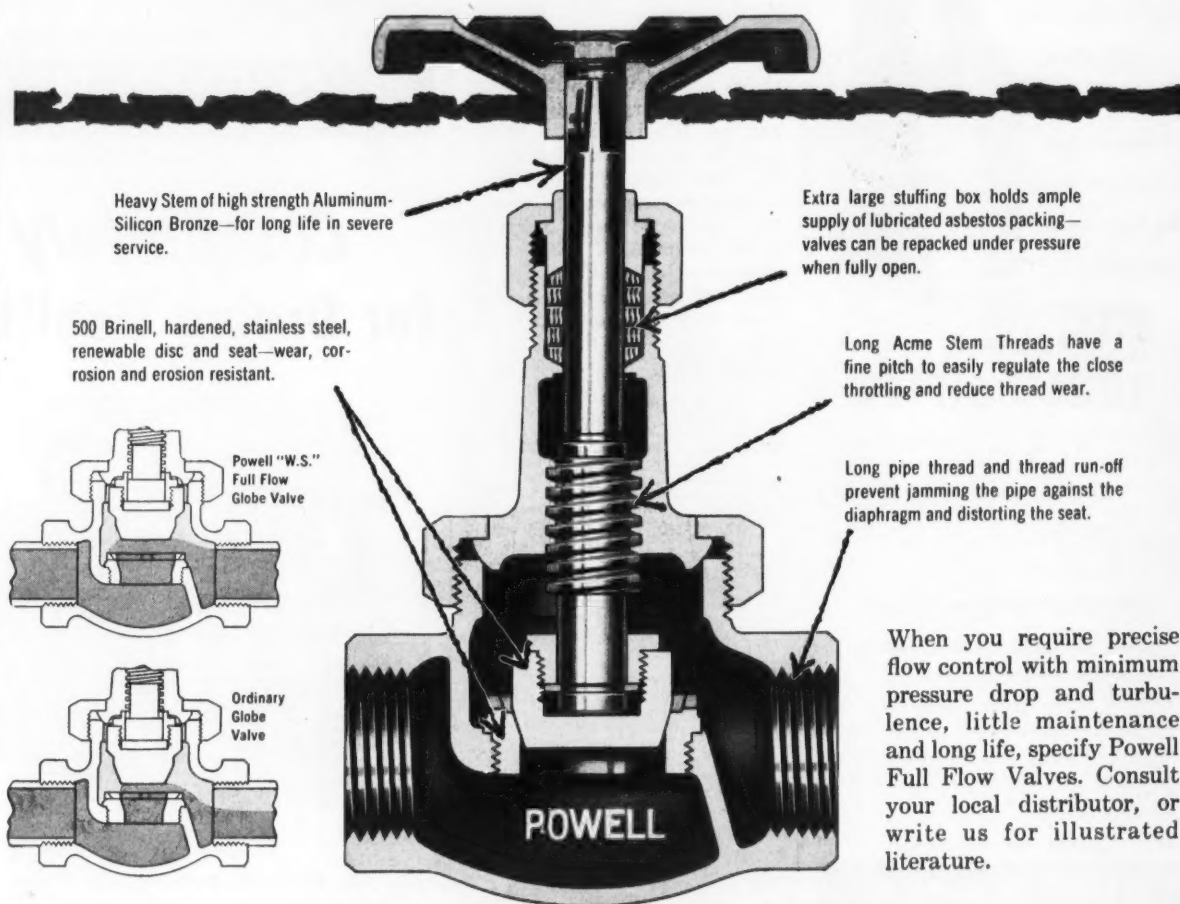


Fig. 2600 (Sectional)—150-pound "W.S." Full Flow Globe Valve, Screwed Ends

THE WM. POWELL COMPANY • Dependable Valves Since 1846 • Cincinnati 22, Ohio

Check 1897 opposite last page

Controlled Sifting FOR BETTER QUALITY!

With gravity sifting methods, there's danger of uneven dispersion ... depending on the mix and its ingredients. When you use the high speed, centrifugal



abbé TURBO SIFTER

perfect dispersion of the ingredients is assured. Users with colored ingredients stress the greater uniformity of color that the Abbé Turbo Sifter gives them. This is true for any material and with any mesh.

Sifts 2 to 10 Times Faster... and Uses Less Floor Space

This unique unit requires less than one-fourth the floor space of conventional units, but sifts 2 to 10 times as fast, depending on the product — with a clean, complete separation. Write for Bulletin No. 65.

Address Department 46

abbé ENGINEERING CO.

420 Lexington Ave., New York 17, N.Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Sifters • Cutters • Mixers

Check 1898 opposite last page

ENGINEERING & SAFETY

Non-conducting ladder is safe around electricity

Uses: Ladder is designed for use in service, maintenance, and repair around electricity and chemicals.

Features: It is non-conducting and non-absorbent.

Description: High-tensile strength aluminum rungs are permanently attached to glass-fiber-reinforced side rails by bushing-gusset plate construction. Both straight and extension models are available.

(Alco-Lite safety ladders are a product of Aluminum Ladder Company, Worthington, Pennsylvania.)

Check 1899 opposite last page.

Welding wire guide

Quick and convenient answers to almost every question that can be asked about welding wire for use with manufacturer's gas-shielded metal arc welding process may be found in handy 84-page pocket guide. Form ADC 873 — Air Reduction Sales Co., div. of Air Reduction Co., Inc., 150 East 42nd St., New York 17, New York.

Check 1900 opposite last page.



"Our next speaker here
has just returned from
the Middle East."

PRATER CAN Solve YOUR! AIRLOCK FEEDER PROBLEM.

More than 2000 different Prater Airlock applications have solved processing requirements for 300 concerns. You'll find there IS a Prater Airlock for your need ... from low pressure dust control to high pressure pneumatic conveying.



STANDARD DUTY

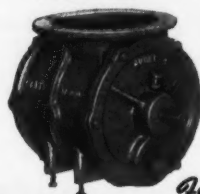
Principally adapted for sealing off collectors against air leakage.

Four Sizes ... 6", 8", 10" and 12".

HEAVY DUTY

For applications involving high pressure Pneumatic Conveying or Volumetric feeding of finely ground materials.

Four Sizes ... 6", 8", 10" and 12".



BLOW-THRU

For pneumatic conveying systems handling flour or similar fine powder or granular material. Available for 2", 3" or 4" Conveying Lines.

Send for informative Booklet P-58
"How to Select a Rotary Airlock Feeder"

Foremost Builder of Rotary Airlock Feeders

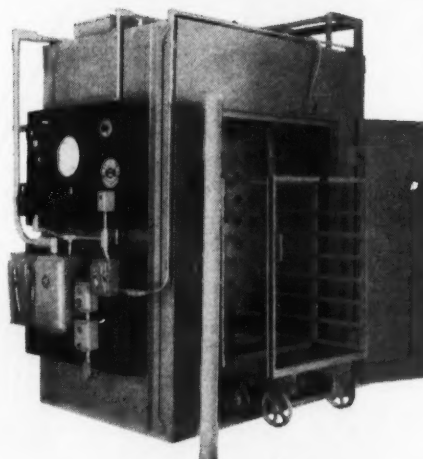
PRATER PULVERIZER COMPANY

1513 SOUTH 55TH COURT

CHICAGO 50, ILLINOIS

Check 1901 opposite last page

Completely Controlled for Drying Quality and Safety



No matter what the chemical nature or sensitivity of material to dry, in Rockwell Recirculating Ovens you are sure of complete product uniformity, with complete operating safety.

Standard cabinet and truck type ovens (gas, electric or steam) are available with aluminized steel interiors or with special stainless steel; fume-tight; recirculating fans are interlocked with heating system for shut-off in event of power or fuel supply failure; other safety features.

For drying, baking, curing, evaporating or finishing, Rockwell Ovens are RIGHT for you. What's your heat processing problem?

Write for Bulletins 125 & 126

W. S. ROCKWELL COMPANY

2208 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

Check 1902 opposite last page

CHEMICAL PROCESSING

**High-accuracy metering
with discharge rates
from 25 gpm to 0**

Corrosion-resistant pump
has one-piece shaft

Uses: For handling non-viscous or viscous liquids in chemical and food processing industries.

Features: Micrometer adjustment permits accurate rate settings which keep discharge rate constant to provide high-accuracy metering and proportioning.



Portable metering pump is easily disassembled for cleaning

Description: Sanitary metering pump can be supplied in either No. 316 stainless steel or nickel alloy. Easily disassembled for cleaning, unit is corrosion resistant, including pump housing, and has easily replaceable long-life O-ring sealing.

(Further information on metering pump may be obtained from Graham Transmissions, Incorporated, Menomonee Falls, Wisconsin.)

Check 1903 opposite last page.

**Cream protection
against acids
or solvents**

Uses: Protective hand cream.

Features: High silicone content provides resistance to solvents, acids, and alkalis.

Description: Product is supplied in eight ounce jars or can be ordered in special sizes. Formula includes lanolin to restore natural skin oils.

(Sila-hand protective cream is a product of Warco Laboratories, 13609 S. Normandie Ave., Gardena, Los Angeles, California.)

Check 1904 opposite last page.

GUTS!

no other pipe insulation
stands up like

**tough
UNIBESTOS**
to save replacement
and maintenance costs

UNIBESTOS® won't shatter from hammer blows . . . is undamaged by fumes, water, or moisture . . . yet cuts and fits easily — goes on quickly — may be removed and reused time after time without damage or loss of efficiency. Sizes to 44" o.d.; single-layer thicknesses to 5". The whole cost-cutting story is yours for the asking. There's only *one* UNIBESTOS!



UNARCO

UNION ASBESTOS & RUBBER COMPANY

1111 W. Perry Street, Bloomington, Illinois

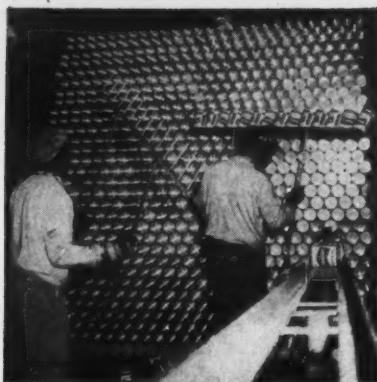
INSULATIONS • PACKING • GASKETING
ASBESTOS TEXTILES
INSULATING CEMENTS

Check 1905 opposite last page

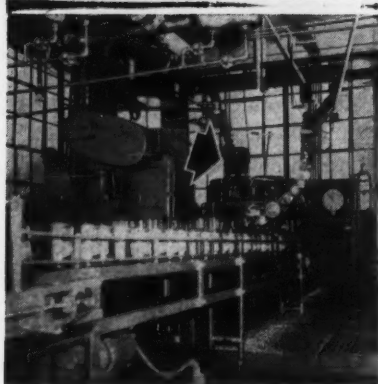
Continuous automatic packaging line at The Atlantic Refining Company . . .

Fills, cases, palletizes one-quart cans

GEORGE V. MICHAEL, Assistant Editor
with G. E. STEEVER JR.,
Departmental Assistant
Package Group, Lubricating Section
The Atlantic Refining Company
Philadelphia, Pa.



CAN-FEEDING: Quart cans are received in boxcar bulk shipments. Three operators remove cans (usually from more than one boxcar at a time) with these 14-prong "rakes" and deposit them on conveyor track. Cans roll and drop into conveying system (beneath dock) which carries them directly to filling machine. Boxcar is the warehouse, and no inside storage space is used for storing empty cans. One boxcar holds about 52,000 cans (a little over two hours supply).



FILLING: Cans are conveyed directly into building and delivered upright to a rotary, 21-pocket, piston filling machine. An air jet blows out cans prior to filling. Maximum filling rate of this machine is 450 cans per min. However, to synchronize its operation with rest of the equipment, rate is maintained at 400 per min. Machine operates on a no can-no fill principle.

Machine is equipped with a temperature fill-control device (arrow) to keep over-fill to 1/8 ounce. This device, developed by Crown Cork and Seal's John Schmidt and pioneered in use by Atlantic, adjusts fill to temperature of oil to account for volume variations with contraction or expansion. It consists of a thermocouple placed in filler bowl and connected with motor drive to filler-volume adjuster. As temperature of oil changes, adjuster automatically compensates for volume variation in accordance with temperature-density relationship of product. Temperatures are indicated and recorded on charts (behind filling machine). Atlantic figures device has cut excess over-fill by 75%.

(Temperature control-fill device is manufactured by Crown Cork & Seal Company, Inc., 9300 Ashton Road, Philadelphia 36, Pa.)

Check 1907 opposite last page



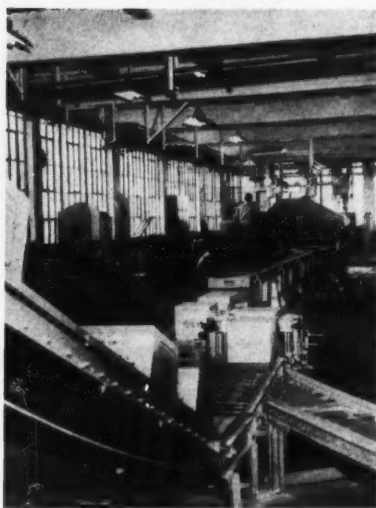
CASING: Incorporation of automatic equipment to handle this phase of the operation has been key to high-speed production of the line. The "Packomatic" equipment, which incorporates a FMC Non-Shock caser, groups the cans, draws knocked-down carton from magazine, forms the case, inserts cans, and seals packaged unit. Unit now handles 16 to 17 cases per minute.

Cans are packed in the usual top-and-bottom opening style of shipping case, 24 per case, in a 4 x 3 x 2 pattern.

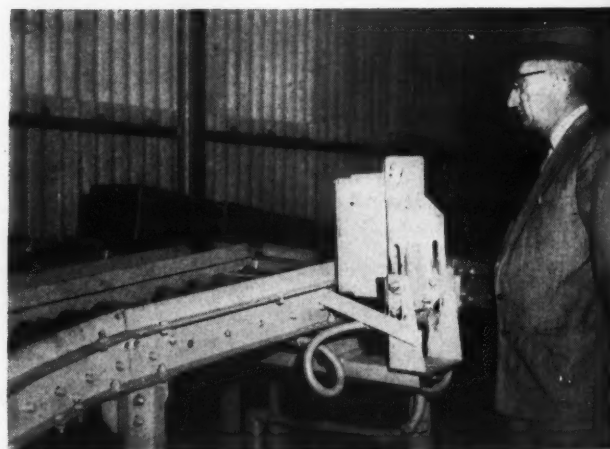
Knocked-down cartons contain a colored stripe on one end to guide operator in placing them into magazine. Cartons are checked prior to use to make sure they meet specifications for forming as oversized cartons will jam.

("Packomatic" machine for forming, loading and sealing cases is manufactured by J. L. Ferguson Company, Joliet, Illinois.)

Check 1906 opposite last page



CHECK-WEIGHING, COUNTING, PRINTING: After cases are closed and sealed, they are moved over a conveyor checkweigher through a counter and printing station. Here they are imprinted on four sides with information as to grade, viscosity and filling code. They are then conveyed up one floor to palletizer feeding station.



PALLET-LOADING: Automatic pallet-loader handles cases from three different packaging lines — one-quart, five-quart, and two-gallon. Unit will handle 35 cases per min.

The above photo shows the feed station for pallet-loader. Cases from the three lines accumulate here on their separate conveying lines. As soon as there are enough of one kind to fill a pallet, that particular conveying line is actuated. A photo-relay counts out proper number of packages to fill a pallet and cuts off line when this number has passed.

Here is how palletizer knows there is a sufficient number of packages on line: Proper amount of cases will form a line for a certain distance back along the conveyor. When a package is resting at this point, it depresses a roller. Depressing the roller closes a contact and signals the palletizing machine that the line is ready.

at 400 per minute

and automatically palletized.

- Rate averages out to 400 cans or around 16 cases per minute.

- Empty cans are received in bulk. Boxcar is the warehouse and cans are conveyed directly from car to filling machine.

- Runs are eight hours/day, five days/week. Shutdown is one day/month for cleaning and adjusting.

- Products handled are: five grades of Atlantic motor oil; five grades of aviation motor oil; two grades of premium (all-weather) oil; one grade of transmission oil; one grade of motorboat oil; and four grades of "Daytona" brand motor oil for export.

- Filling machines are equipped with temperature fill-control devices which automatically compensate volume of fill to temperature of oil.

- Downtime for changeover between brands is 20 minutes — this involves changing oil supply, types of cartons and cans, and dies for embossing.

- Downtime for changeover between grades of same brand is 10 minutes — this involves changing oil supply and dies.

- Scheduling — Atlantic will run no more than three grades a day and prefers to keep to two a day.

- Operators — Line employs five men plus one lift-truck driver. Three men unload cans from boxcars. One man oversees filler and feeds lids to seamer. Another man feeds cartons to "Packomatic" which forms, packs and seals cases. Driver removes loaded pallets from and feeds empty pallets to automatic palletizer. The operators work on a group incentive plan.

- There are three other packaging lines alongside the one-quart line. These handle five-quart, two-gallon, and one-quart specialty items. Five-quart and two-gallon lines also feed into automatic palletizer from separate conveying systems. Palletizer's total capacity is 35 cases per minute.

- Equipment is operated from central control point and the entire line has centralized lubrication.

Incorporation of automatic case-forming-packing-sealing equipment has allowed Atlantic to convert from using re-shipper cases of cans on semi-automatic one-quart line to higher-speed, fully automatic line and a bulk-can handling system. New line has more than doubled former production.

A more detailed description of equipment in one-quart packaging line is given in picture story on opposite page.



PALLETIZING: Palletizing machine automatically loads cases on a 40" x 40" pallet in an interlocking pattern.

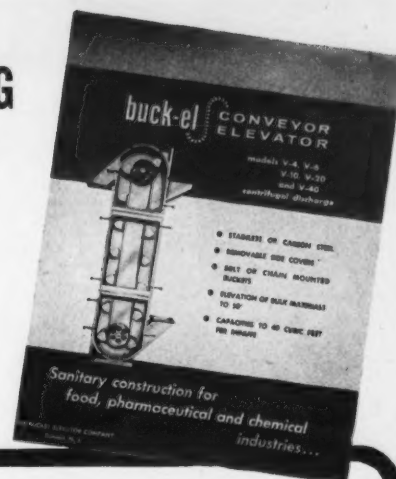
When a particular line is fed into machine, it arranges cases in a pre-set pattern for each row. Loaded pallet consisting of four layers of ten cases each is then conveyed from machine to pick-up station.

Loaded pallets are removed by lift-truck to storage area. Two electric lift-trucks handle all unloading plus loading of empty pallets. Operation allows each driver two minutes to pick up load and make run before picking up next load.

(Model D Automatic Pallet Loader is manufactured by The Lamson Corporation, 303 Lamson St., Syracuse 1, New York.)

Check 1908 opposite last page.

Write today for NEW FREE CATALOG on BULK MATERIAL SANITARY CONVEYOR ELEVATORS

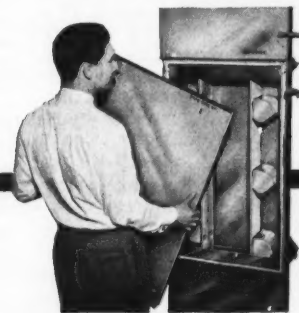
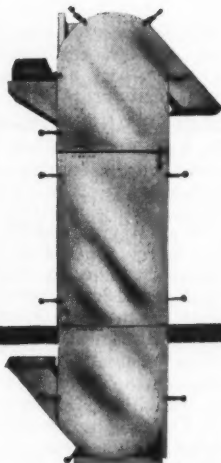


SEE HOW EXCLUSIVE CANTILEVER DESIGN permits complete removal of casing covers, pulleys and belting without disturbing bearings, mechanical seals or other operating machinery.

Can be completely disassembled in five minutes . . .

- for easy maintenance and cleaning
- for changing buckets to meet new operational requirements

Used by chemical, food, and pharmaceutical industries for elevating bulk materials



buck-el CONVEYOR
ELEVATOR

product of
THE BUCKET ELEVATOR COMPANY
360 So. Springfield Avenue
Summit, New Jersey

Phone: CRestview 3-5359

Check 1909 opposite last page



YALE outperforms any loader—handles 25% more material every hour...Field tests prove it!

EXTRA WORK PER HOUR. No matter what bulk you handle, you'll get more productive work at less cost with the new Yale Industrial Tractor Shovel. *It carries more*—full 2500-lb. bucket capacity. *It moves faster*—accelerates to operating speed of 8 mph in 3.5 seconds—to 13 mph in 5.5 seconds. Exclusive Yale Torque Transmission (fully automatic) permits quicker, smoother starting, eliminates shifting, provides more power under load conditions—speeds cycle operations. Gasoline or LP-Gas.

EXTRA SAFETY. Yale's exclusive Safety-Curve Arms assure extra-safe elbow room—extra visibility when bucket is raised.

EXTRA MANEUVERABILITY. This is the first tractor shovel designed

especially for industrial use. It's compact—only 117" overall length—can maneuver in any aisle wide enough for a wheelbarrow.

EXTRA LOADING AND DUMPING FEATURES. Yale's exclusive 45° ground-level tipback insures the ultimate in loading action—and a grade-level carrying position to minimize spillage. Exclusive 6' dumping clearance is the highest on any model of similar wheelbase. Bucket is automatically self-locating—lowers from full dump-position to ground-level. Bucket automatically returns to digging position.

For a demonstration in your plant or for actual case histories, write to The Yale & Towne Manufacturing Co., Philadelphia, Pa., Dept. 1210.

COMPARE!

For only 3¢ more per hour* the Yale Industrial Tractor Shovel offers these exclusive features

Exclusive Yale Torque Transmission (fully automatic)

Exclusive 45° ground-level bucket tipback

Exclusive Safety-Curve Arms

Exclusive accelerating speed of 8 mph in 3.5 sec.

Exclusive sealed brakes

Exclusive forward and rear operating lights

Exclusive 6' dumping clearance

*Based on comparative initial costs depreciated over 10,000 working hours.

HANDLING & PACKAGING

Vacuum 'cleans' polyethylene tubes before filling

Uses: Filling and sealing polyethylene tubes.

Features: High-speed filling machines have vacuum-cleaning units that remove any trace of lint or dust from tubes prior to filling. Destatizing bar frees tubes from static electricity characteristic of polyethylene to give maximum cleaning action.

Description: Machines come in 11- and 22-station models with output under single-fill conditions of 35 to 40 tubes/min on smaller model and 60/min on larger. Set up for double filling, 22-station model can turn out 120 filled tubes/min. Both models have no-container, no-fill operation.



High-speed filling machine vacuum-cleans polyethylene tubes before filling and sealing them

Filling machine was designed specifically for filling Bradley Container Corporation's Bracon polyethylene tubes. However, it is adaptable for similar operations with metal tubes and other containers.

(Filling machine is manufactured by Saga Packaging Machinery Division of A & M Tool & Die Co., Inc., Southbridge, Mass.)

Check 1911 opposite last page.

YALE*

REG. U.S. PAT. OFF.

YALE & TOWNE

INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSES • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

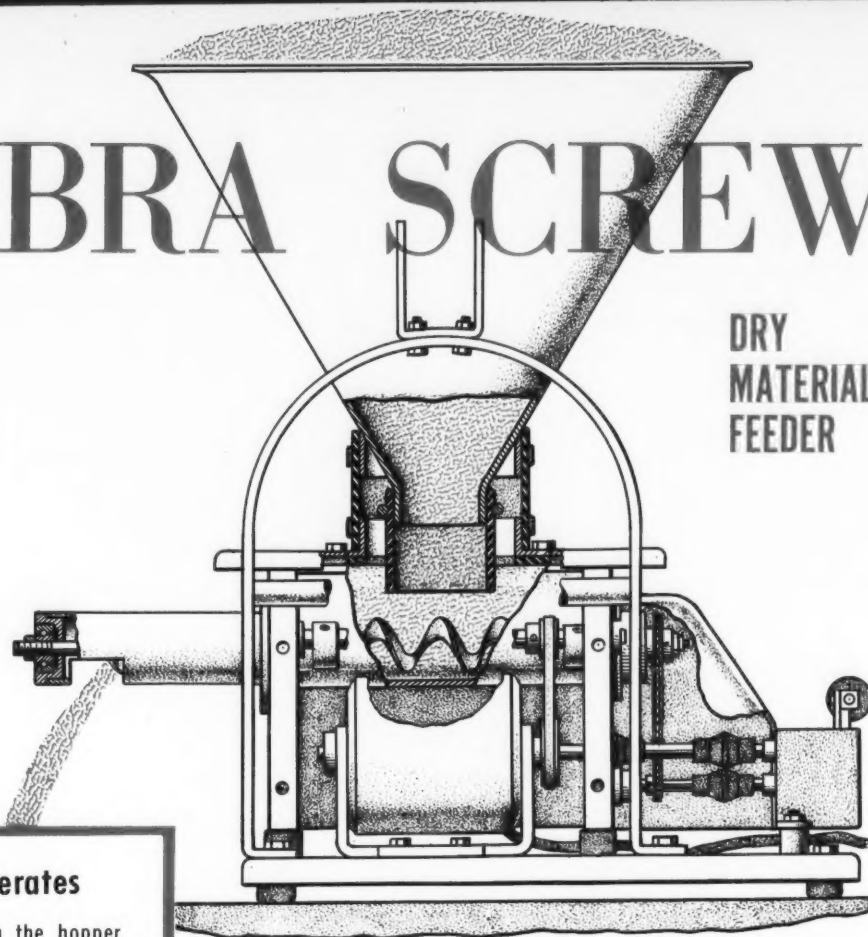
Check 1910 opposite last page

For more information on product at right, specify 1912... see information request blank opposite last page.

CHEMICAL PROCESSING

VIBRA SCREW®

DRY
MATERIALS
FEEDER



How it Operates

Material flows from the hopper under controlled vibration, collecting in the constantly vibrating trough. Material level in trough is constant—always submerging screw to same depth. As the screw rotates, it vibrates integrally with the trough and tube. Metering of material through discharge tube is by screw rotation entirely, since vibration is transverse to screw axis. Vibration fluidizes material to insure complete filling and emptying of the screw. This action plus level control over screw produces a uniform density in material flowing into screw. Controlled density plus constant screw displacement results in highly accurate performance.

METERS DRY MATERIALS as ACCURATELY as Liquids

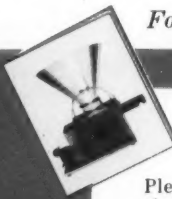
Here's a NEW volumetric dry material feeder that handles practically any material—powder, pellets, flakes—with unmatched accuracy... an accuracy heretofore attainable only with liquids.

The unique, exclusive Vibra Screw principle combines screw rotation and vibration with vibration of the hopper, trough and tube to assure precise feeding—even with "sticky" materials. Bridging or flooding are eliminated and feed rates are controlled by screw speed through a variable speed transmission.

Dependable, dust-proof Vibra Screw moves and meters materials at rates as low as ounces per hour or as high as tons per hour with second-to-second or minute-to-minute uniformity. This new concept in feeders is available in screw sizes ranging from 1/4" to 10" with 100-1 variable speed rates in any size.

Solve your dry material handling problems now with the revolutionary Vibra Screw feeder that enables you to meter solids as easily as liquids.

For more information, clip and mail coupon.



VIBRA SCREW COMPANY

1 Montgomery Street, Belleville, New Jersey
PLymouth 1-0624

Vibra Screw Company
1 Montgomery Street, Belleville, New Jersey

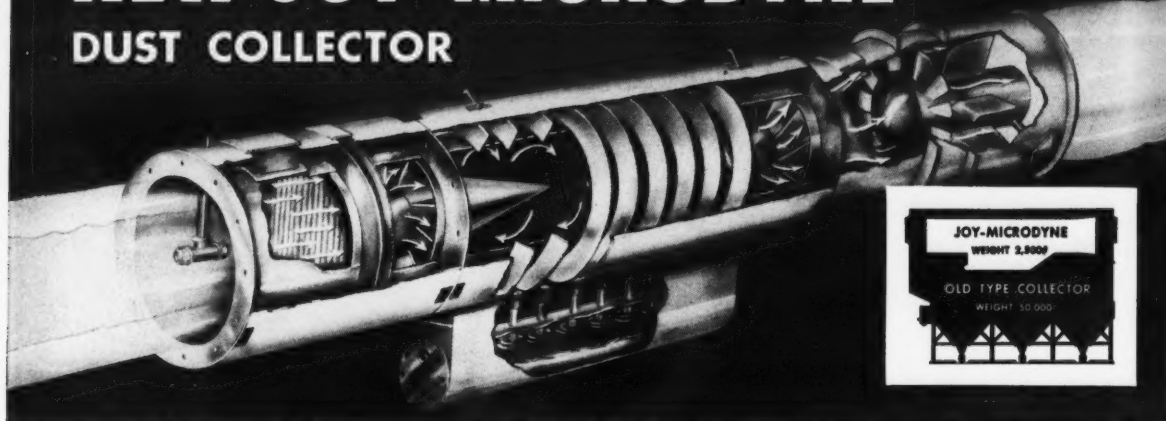
Please send literature. I would like to know more about Vibra Screw for handling _____

NAME _____ TITLE _____

COMPANY _____

CITY _____ STATE _____

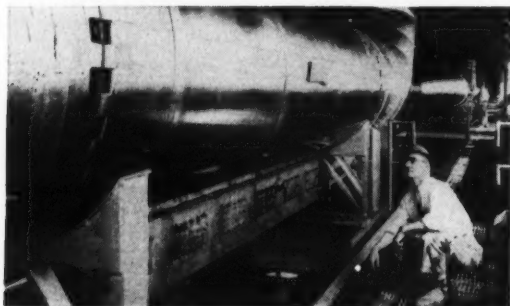
NEW PROVED JOY-MICRODYNE DUST COLLECTOR



Profile of a Problem Solver

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.



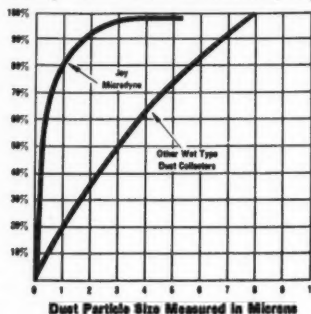
This 48,000 cfm installation shows compact assembly and space economy of in-duct placement.

SAVES SPACE—Installs as an integral section of ductwork; requires only 1/10 to 1/20 the space of conventional units. 2500 cfm unit is 10 feet long; 1.5 feet in diameter.

SAVES WEIGHT—Even the largest unit—64,000 cfm, 5 feet in diameter, 32 feet long—weighs only 6,500 pounds . . . or 1/5 the weight of conventional collectors. 2,500 cfm unit weighs only 325 pounds.

SAVES WATER—The largest Joy collector requires only 48 GPM flow—much less than comparable wet collectors. Add a Delpark Filter (Sold by Joy) and water can be recirculated to recover valuable dusts. The filter also reduces water borne solids to give a dependable, clear water supply from a dirty water source.

SUCCESSFUL INSTALLATIONS—Joy collectors from 500 cfm through 64,000 cfm are now in use collecting such widely varied dusts as hematite, copper and uranium ores, coal, quartz, limestone, phosphate, stainless steel and titanium carbide grindings. For answer to your dust collecting problems, write, wire or call: Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.



Performance graph of actual installation shows efficiency of the Joy-Microdyne Dust Collector. (A micron is 1/25,000 inch)

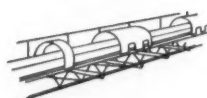
WSW 1 7002-231



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FREE BULLETIN
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JOY

... EQUIPMENT FOR INDUSTRIAL PLANTS ... FOR ALL INDUSTRY



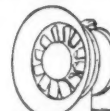
Conveyors



Industrial
Compressors



Electrical
Connectors



Fans and
Blowers

Check 1913 opposite last page

HANDLING & PACKAGING

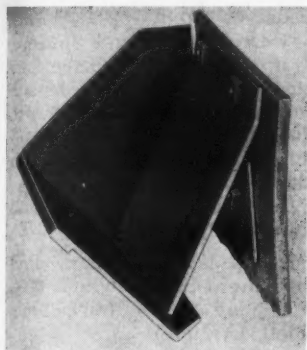
**No material build-up
In these buckets!
They self-clean**

Elevator conveyor buckets
install on any belt

Uses: Elevating granular
materials.

Features: Buckets' unique
design assures all material is
dumped. They are self-clean-
ing and allow no material
build-up.

Description: Self-cleaning
action is obtained with aid of
separately mounted back
stripper-plate. Both stripper-



Cut-away view shows how back
stripper-plate and bucket are
mounted separately on elevator
belt to give self-cleaning action

plate and bucket proper are
mounted easily and simply on
any belt elevator. As bucket
goes over top pulley to dump
material, stripper-plate starts
around radius independently
from bucket proper. This
forces stripper-plate to move
outward, providing irresistible
leverage to loosen bucket
contents.

When bucket itself follows
over top of pulley, all of dis-
lodged material is ejected.
Belt wear is reduced, as de-
sign allows belt to follow pul-
ley contour without any
stretching or lifting.

Buckets are available in all
standard sizes and with or
without protective lip.

(M-T-Matic self-cleaning
buckets are manufactured by
Pekay Machine & Engineer-
ing Company, 865 North San-
gamon Street, Chicago 22,
Illinois.)

Check 1914 opposite last page.



HERE'S HOW INLAND HELPS JOHNSON'S WAX LIGHTEN THE BURDEN OF HEAVY TRAFFIC FLOORS.

When the makers of
Johnson's Wax developed their entirely new STEP-AHEAD floor finish for heavy traffic commercial
application, their next objective was delivery of this remarkably effective product into the hands of
users, "as shipped."

Factory fresh condition, complete freedom from contamination, ease of shipment and readiness
for use, were the primary considerations. Inland Steel Container packaging specialists had the
answer to this requirement by supplying Johnson with a drum "protectioneered"* with a lining
that delivers STEP-AHEAD floor finish . . . ready for use anywhere in the world.

*If you are looking for a complete packaging service
for your old and new products, call your Inland Steel
Container representative. Backing him up is Inland's
nationwide reputation for—solving the tough ones!*

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY

Member of the INLAND Steel Family

6532 South Menard Avenue, Chicago 38, Illinois
Plants: Chicago • Jersey City • New Orleans
Cleveland & Greenville, Ohio
Full line of steel and stainless steel shipping contain-
ers, including galvanized and heavy duty ICC drums.



Check 1915 opposite last page

THREE

MIKRO-D ACCESSORIES FOR PROCESS EQUIPMENT

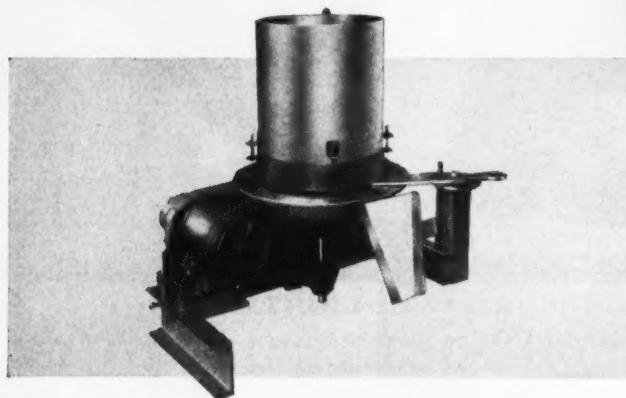
MIKRO

Airlocks
Pre-Crushers
Feeders

Mikro Airlocks, Pre-Crushers, and Feeders are three Mikro-D accessories designed for specific requirements on Mikro products or other process equipment.



MIKRO AIRLOCK The Mikro Airlock is a rotary valve to provide continuous discharge or feed of dry material. Our Mikro Airlock may be operated under slight pressure or vacuum. When used at the discharge of Mikro products, it provides absolute assurance against dusting. It is adaptable for many other applications where it is desirable to continuously feed or discharge material from any bin or conveyor. (Bulletin 54A.)

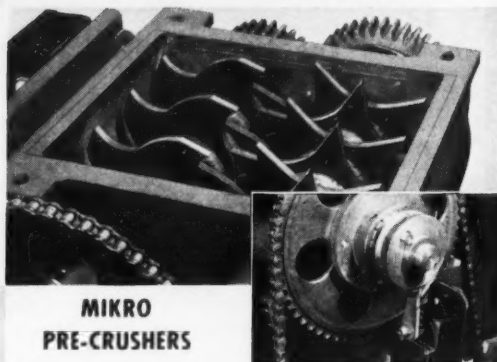


MIKRO FEEDER For feeding powders of all flow characteristics, hard, granular materials, spherical pellets, wet, oily or pasty materials with as high as 40% moisture content, and other hard to handle materials.

Provides a wide variation in feed rate, from 0 to 100% in minute increments, with 1 to 5% accuracy depending upon uniformity of material being fed. This feeder permits continuous feeding.

Feeding rate from 25 grams minimum to 100 lbs. per minute, or tons per hour. Hopper capacity up to 300 cu. ft. Unit available with steel or stainless steel construction. (Bulletin 54B.)

GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM A LARGE STOCK WITHIN 48 HOURS.



MIKRO PRE-CRUSHERS

Single or double-roll units furnished, depending on the nature of the material to be pre-crushed. In some instances the unit can be placed immediately over the feed screws of the MIKRO-PULVERIZER with excellent results. On other applications it is desirable to have a surge hopper between the pre-crusher and the feed screws, particularly if the nature of the feed material varies from powder to large lumps, and if a magnetic separator is to be used.

It is usually desirable that both the precrushing and pulverizing be handled as one operation and in one unit. Normally the pre-crushers are designed for soft or semi-hard crushing operations.

Mikro-D

**PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.**
6C Chatham Road • Summit, New Jersey

HANDLING & PACKAGING

**Thin-walled Kel-F tube
is distortion-free
in sterilization**

Cuts drum packaging costs

Uses: For packaging one-shot doses of parenteral solutions and antibiotics. It may also be formed into filled, sealed ampoules.

Features: Company has developed technique for fabricating Kel-F brand halofluorocarbon plastics tubing with a 5-mil wall thickness that will not distort in steam or heat sterilization. Because of lesser amount of plastic required, cost per package is reduced.

Description: Kel-F plastic, from which tube is made, has good optical clarity, tensile strength of 4500 to 5700 psi, impact strength of 3.6 lb, and heat-sealing properties which assure strong bond. It is impermeable to alcohol and formaldehyde.

(Kel-F plastic tube is product of Minnesota Mining and Mfg. Company, 900 Bush Ave., St. Paul 6, Minn.)

Check 1917 opposite last page.

**Swivel-mounted conveyor
saves time and labor
in bulk handling**

Maneuvered by one man

Uses: Airslide conveyor is designed for handling dry pulverized, crushed, and granular material pneumatically in bulk.

Features: Double-swivel unit feeds an unlimited number of locations within its scope of movement. Unit is easily maneuvered by one man from one discharge point to another.

Description: Conveyor is comprised of two sections coupled together in a double-swivel system. It is available in all standard sizes and capacities. Permanently set up at primary bulk delivery point, conveyor can be "folded" back out of the way when not in use. It can be used as an isolated unit or as part of integrated system.

Check 1916 opposite last page

HANDLING & PACKAGING

Conveyor unit comprises parallel upper and lower chambers separated by a permeable diaphragm. Air under low pressure passed from lower chamber through diaphragm, partially fluidizing material in the upper chamber, reducing friction and giving it some of the characteristics of a liquid so that it flows under the force of gravity.

In double-swivel system, the discharge end of one section is hinged on a common shaft with the inlet end of the other. Material thus passes by gravity into the second, while at the same time the discharge end of the second can be swung nearly a full 360°.

(Double-swivel mounted Airslide conveyor is product of Fuller Company, Subs. of General American Transportation Corp., Catasauqua, Pa.)

Check 1918 opposite last page.

Spots 1% variation in package weight at 400 per minute

Uses: Checking weight of packages.

Features: Unit is designed to sense weight variation within $\pm 1\%$ at a top speed of 400 packages per min.

Description: Compact, electronic check weigher measures 48" long by 24" wide. Fully automatic, it operates on continuous basis at constant speed. Controls to adjust weight settings are simple and readily accessible on side panel. Recording instruments or numerical counters can be supplied if desired.

The no-stop constant motion of the equipment makes it possible to handle a variety of package shapes — round, conical, rectangular, oblong, or irregular. Unit handles packages up to 10" wide by 10" long, and in weight ranges from 1 ounce to 1 pound, or 8 ounces to 3 pounds.

(Electronic check weigher is product of Packaging Machinery Div., Food Machinery and Chemical Corp., 4992 Summerdale Ave., Philadelphia 24, Pennsylvania.)

Check 1919 opposite last page.



* Constant Source of Supply

A "Background" of vast forest reserves, basic pulp production and kraft paper manufacturing is behind every Multiwall order serviced by Raymond. As a division of the Albemarle Paper Mfg. Co., Raymond provides Multiwall users with a dependable source of supply, assuring the prompt deliveries necessary to meet production schedules of today's manufacturing lines.

Special Problem? New Multiwall developments may be the answer. Write Raymond Bag Corporation, Research & Development Division, Middletown, Ohio.

BAG CORPORATION

A division of Albemarle Paper Mfg. Co.
MIDDLETOWN, OHIO • RICHMOND, VA.

Down goes a **Magliner**



DOWN GO LOADING COSTS!

And they'll stay down with Magliner magnesium dock boards on the job! Magliners speed loading, eliminate dock congestion . . . get extra work from power trucks and other loading equipment. Magliners are magnesium-light—easy to put down . . . easy to move. No heavy lifting . . . no injury hazards. Men, loads and equipment move *fast, sure, safe*. Magliners are magnesium-strong, too . . . built to take it . . . safely handle loads up to 20,000 lbs. Low initial cost. Less maintenance. Dependable long-life service. *Economy and cost-savings* right down the line! Put all these advantages to work for you. Put Magliners on your dock!



DOCK BOARDS

Write for Bulletin DB-204
MAGLINE INC., P. O. Box 1710
PINCONNING, MICHIGAN

Canadian Factory: Magline of Canada, Ltd., Renfrew, Ontario

Check 1921 opposite last page

BULK MATERIAL MEN:

AUTOMATE

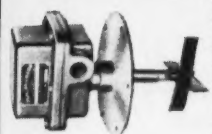
PRESENT EQUIPMENT FOR

BULK MATERIALS

HANDLING WITH

ROTO-BIN-DICATOR

LOWEST COST MODERNIZATION



If you store, process or pack bulk material you can have automatic control of handling at nominal cost with a few Roto-Bin-Dicator bin level indicator units. Prevent waste, protect equipment, save repairs. Big savings year after year. U. L. Listed Standard and Explosion-Proof Units.

THE BIN-DICATOR CO.

Write for detailed literature
or call

13946-D Kercheval • Detroit 15, Mich. VALley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

Check 1922 opposite last page

MATERIAL HANDLING and PACKAGING

Advantages of flexible handling system are extended to loads of 40 cu yd and more as . . .

Detachable containers go heavyweight

Uses: Primarily for large accumulations of waste materials. But being developed are large containers for sludge and asphalt; tank-type containers for solvents, chemicals; and cargo-type containers for raw materials, and finished products.

Features: Containers are detachable, have capacity of over 40 cu yd, and good weight distribution. Legal load limits up to 30,000 lb or virtually unlimited off-

the-road capacities are available. Operation is completely hydraulic, without use of winches, sheaves, telescopic cylinders, cables, or chains. All pick-up and handling operations can be performed without driver leaving cab of truck. System has ability to put containers on and off docks.

Description: Detachable container material handling system is of simple design. Components are tilting frame, two hydraulic raising and lowering cylinders, and double-acting bail cylinder. Bail cylinder pulls containers up tilting frame with ratcheting action against recessed hooks, spaced at intervals under container.

Maximum height and length of container is limited only by state regulations. Off-the-road models will be available with hoisting capacities limited only by load capacity of truck.

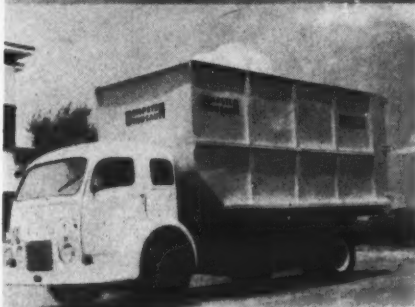
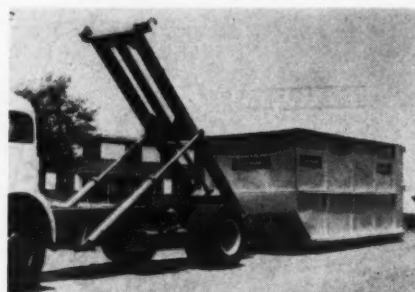
Tipping frame with double-acting hydraulic cylinder mounted in rear is basic element of truck-mounted unit. Cylinder moves spring-loaded U-shape bail forward and backward.

Operation

To pick up container, driver raises tipping frame to 45° angle, lowers his automatic jack, and backs to container. Bail, a few inches above the ground, encounters curving guide rail on front base of container and slides back until first lifting hook recess is reached. Here, spring under bail drives it up and forces it to engage hook. The hydraulic cylinder is then drawn back the full length of its stroke, pulling container up on frame.

Cylinder is then extended, automatically disengaging bail from first hook and driving it down guide rail under container to second recessed hook — spaced

4
Container is pulled up on tilting platform by progressive ratcheting action of spring-mounted bail in series of recessed hooks on container bottom. After container passes center of gravity, tilting frame is lowered to horizontal. Bail pulls container forward and locks it in carrying position



CHEMICAL PROCESSING

to coincide with length of cylinder stroke.

After bail snaps into this hook, cylinder is moved forward, pulling container farther up on frame. This forward-and-backward ratcheting cycle is repeated and tipping frame is maintained in a parallel position with bottom of container until it is locked in carrying position.

Upon reaching its destination, load can be dumped or container can be put down on the ground or pushed off on a dock by automatically reversing ratcheting cycle of bail against hooks under container. Tilting frame stays horizontal when putting container on a dock.

(Dempster-Dinosaur is product of Dempster Brothers, Inc., PO Box 3127, Knoxville 17, Tennessee.)

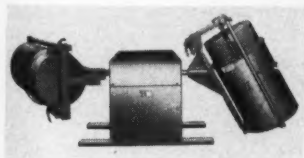
Check 1923 opposite last page.

Loading, unloading easy with drum holders of mixing unit

No heavy lifting required

Uses: For mixing drum contents.

Features: Specially designed drum holders of unit facilitate loading and unloading. Holders unlock at top, pivot at bottom, and swing to vertical, floor-

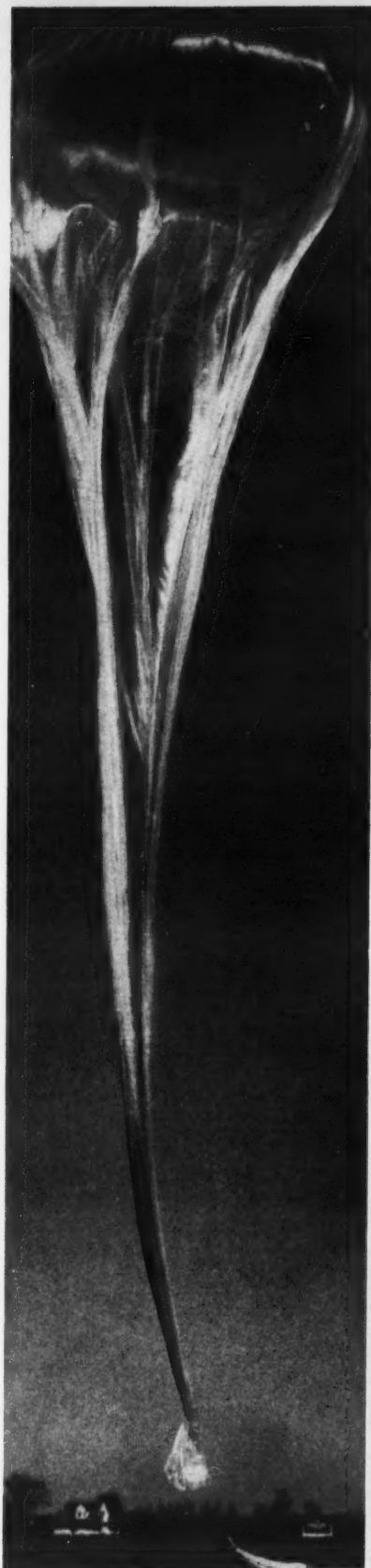


Drum holders of tumbling unit permit floor-level loading and eliminate heavy lifting

level position. This permits heavily loaded drums to be quickly and easily placed in the drum holders or removed with no heavy lifting required.

Description: Drum tumbler unit is equipped with built-in drum extenders, providing extra space for thorough mixing of full drum loads. Fast-

To page 201



VISQUEEN

TRADEMARK

'L'


FILM



If you make giant balloons light and strong enough to soar into the upper atmospheres . . . or ship corrosives, acids and adhesives . . . or transport hydroscopics in drums or cartons—look to VISQUEEN 'L' film to do the job better, less expensively. VISQUEEN 'L' film is stronger . . . tougher . . . as pinhole free as a polyethylene film can be. Write for samples.

VISQUEEN film—the first and foremost polyethylene film.

A product of the long experience and outstanding research of

VISKING COMPANY Division of  Corporation

P.O. Box CP10-1410, Terre Haute, Ind.

In Canada: **VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED**, Lindsay, Ontario.

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Check 1924 opposite last page



NOW! THE COUPLING WITH THE 4-WAY FLEX!

DODGE *Para-flex*

FLEXIBLE CUSHION COUPLING

THE NEW IDEA IN FLEXIBLE COUPLINGS...WITH A FLEXING BODY THAT AUTOMATICALLY COMPENSATES FOR ALL COMBINATIONS OF MISALIGNMENT AND END FLOAT...AND CUSHIONS SHOCK LOADS!

THIS Coupling "swallows up" misalignment! Its ability to handle multiple displacement is exceeded only in a universal joint. It outperforms the most complex coupling mechanisms—yet it operates with the simplicity—and the dependability—of a modern tire!

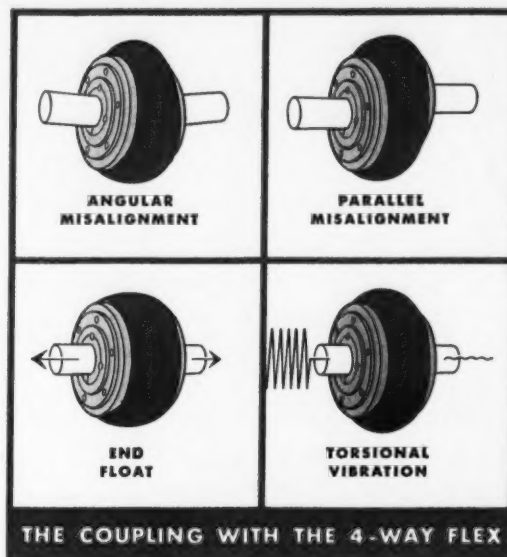
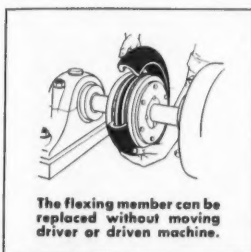
The technological advances that contribute to the miracle of today's truck tires, which are engineered to carry tremendous loads at high speeds and stand terrific shock, have made this new type of coupling possible.

The heart of Para-flex is a tire with synthetic tension members bonded together in rubber. It is pliant. It "fits itself" to changing shaft conditions—angular, parallel, end-float, or any combination of all three! Depending upon the size of coupling and duration of shaft misplacement, it handles angular misalignment up to 4°, parallel up to 1/8" and end-float up to 3/16".

It cushions the stresses of shock loads to a remarkable degree. And it tends to absorb torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

There is no metal-to-metal contact between shafts. They are insulated. No lubrication is required.

Para-flex takes a minimum of space on the shaft. Mounting is simplified through the



use of standard Taper-Lock bushings—no re-boring, no machining. Safety is promoted by flush design; there are no protruding parts. And since the flexible member is molded with a transverse split, it can be replaced *without moving either the driver or driven machine!*

Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 825 hp at 1200 rpm. Call your distributor for early delivery to *make your own test*. You'll witness something revolutionary!

DODGE MANUFACTURING CORPORATION, 6200 Union Street, Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods in the mechanical transmission of power. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer." Or write us.

Check 1925 opposite last page



HANDLING & PACKAGING

From page 199

acting toggle clamps permit rapid opening or closing in one simple motion. Units are constructed of welded steel and have roller chain drives.

Tumbling speed is 30 rpm. Each unit handles two drums of equal capacity. Wide range of sizes to handle standard drums or to meet specific mixing requirements are available.

(Drum tumbler is product of Process Equipment Div., U.S. Stoneware Co., Akron 9, O.)

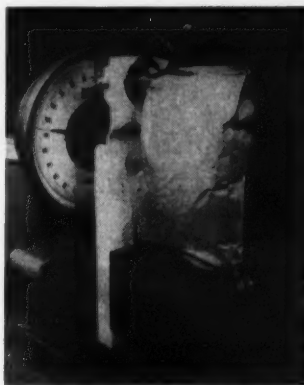
Check 1926 opposite last page.

Unit settles material during packaging, holds accuracy

Uses: Settling and compacting bulky or "airy" materials during packing.

Features: Unit makes it possible to settle material in bag during entire filling cycle, without affecting weighing mechanism of packer.

Description: Model B settler may be quickly installed



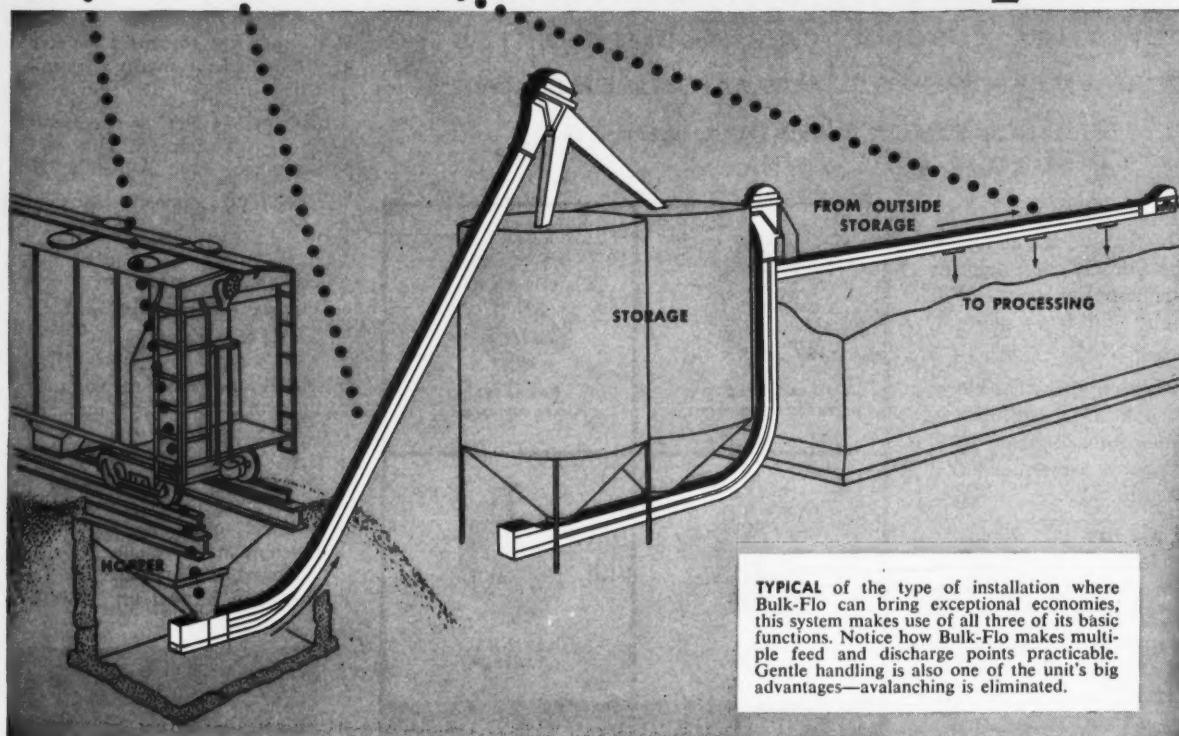
Settler does not transmit vibration to packer scale

on manufacturer's packer or on most other makes of packer with minor modifications. A simple adjustment controls intensity and frequency of vibration to meet physical characteristics of most packaged materials.

(Model B Settler is a product of H. L. Stoker Co., 111 S. College Ave., Claremont, California.)

Check 1927 opposite last page.

It's a feeder! It's an elevator! It's a conveyor!



TYPICAL of the type of installation where Bulk-Flo can bring exceptional economies, this system makes use of all three of its basic functions. Notice how Bulk-Flo makes multiple feed and discharge points practicable. Gentle handling is also one of the unit's big advantages—avalanching is eliminated.

It's 3 units in 1! And LINK-BELT Bulk-Flo works equally well fully or partially loaded

WITH its remarkable ability to combine horizontal, vertical and inclined travel . . . to feed, convey and elevate using a single drive—Link-Belt Bulk-Flo is industry's most versatile medium for handling non-abrasive, non-corrosive materials. In fact, it often replaces several units—in less space and at lower cost.

Bulk-Flo will bring you the tremendous savings it has brought to so many other plants. Let a representative at your nearest Link-Belt office give you an unbiased answer. Or write for Book 2475.

LINK-BELT

BULK-FLO FEEDERS • CONVEYORS • ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

14,602

Check 1928 opposite last page

HANDLING & PACKAGING

Paper feeder attachments

Attachment for manufacturer's power strapping machines which feeds a low cost chip-board paper underneath the strapping is described and illustrated in Bul SPD-182 — Signode Steel Strapping Co., 2600 North Western Ave., Chicago 47, Ill.

Check 1929 opposite last page.

No side wall vibration of hopper or duct by bridge breaker

Screens agitate material

Uses: Unit is designed to prevent bridging of materials in storage bins, supply ducts, and containers.

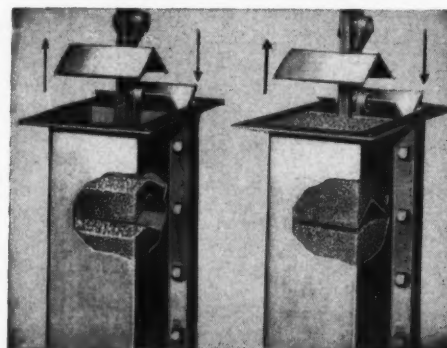
Features: Vibration is not applied directly to the side walls of hopper or duct, but rather to screens which are inserted within chamber and extend downward to lower opening or discharge outlet. Consequently, relatively small mass of steel is agitated to break bridge of material between side walls of container.

Description: Useful in weighing operations where a constant flow is required between storage hoppers and scale feeder, bridge breaker can be furnished in various sizes and shapes to suit existing hoppers and ducts. Hopper sections incorporating built-in bridge breaker units with flanged inlet and outlet for attaching to existing storage bins and ducts can be furnished.

Bridge breakers are available in mild steel, stainless steel, and with Teflon coating. Unit can be furnished for Class I Group D or Class II Group G operation.

(Bridge breaker is product of Thayer Scale Corp., Thayer Park, Pembroke, Mass.)

Check 1930 opposite last page.

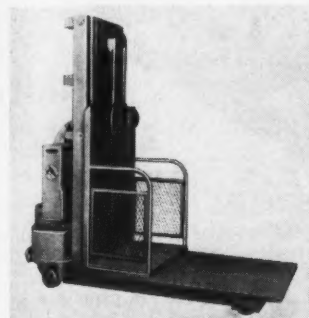


SOLID FLIGHTS permit Bulk-Flo to operate independently of internal pressure. Thus, it needn't be loaded to full capacity in order to provide positive movement of material. Speed is constant—capacity can be varied by merely regulating amount of feed. And regardless of load, Bulk-Flo is self-clearing.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

LATEST INDUSTRIAL TRUCK DEVELOPMENTS

... in design, capacity, operating features, and accessories for improved performance and safety



'Ridle no walkie' ...

...with this line of rider-type, high-lift material handling trucks which are an adaptation of manufacturer's walkie-type trucks. The operator drives while standing on the platform and operates the truck from a complete set of controls located on the platform. All movements of the truck can be controlled from the stand-drive position.

Available in capacities from 1500-3000 lb, trucks are offered with either forks or platforms. Each unit has a 3½' high screen guard at both sides of the operating position to protect the driver. Overall length ranges from 81 through 105". Rider-type JackStacker trucks are product of Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Massachusetts.

Check 1931 opposite last page.

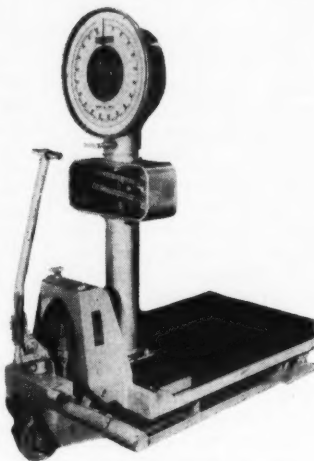
Rear-hinged bucket ...

... is now available on company's 100-hp tractor shovel designed for heavy-duty digging. Rated at 2 cubic yards capacity, the rear-hinge design is said to have more than 25% greater breakout force and about 600 lb greater carrying capacity for handling heavy materials. It is also wider, shallower, and has a steeper grading angle.

Parallel skid plates which

extend from the lift arm hinge to the cutting edge, are said to increase breakout, and provide an extra wear surface along the entire bottom of the bucket. Model 100 TerraTrac crawler tractor shovel is product of J. I. Case Co., 702 State St., Racine, Wis.

Check 1932 opposite last page.



Lift it, weight it, move it

... all in one operation with this hand truck incorporating a complete built-in scale system. By incorporating scale as an integral part of the truck, the necessity of weighing the truck itself is eliminated and an accurate net weight of the material handled is supplied.

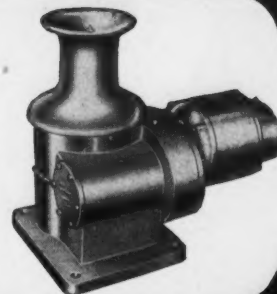
This two-in-one process expedites work enabling manufacturer to move goods faster, at lower cost, without sacrificing quality or control. Lift truck scale is a special-order unit and can be built to accommodate certain types of operations only. Gross weighing capacity of the scale can go as high as 12,000 lb. Lift-truck-scale is product of Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N.Y.

Check 1933 opposite last page.

Webster CAR PULLERS

For Quick, Economical Spotting

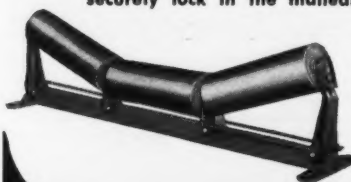
One-man, push-button control. Always ready, always safe. The capstans on WEBSTER Car Pullers are designed to give long life to the ropes, and provide the necessary traction for pulling the load. The high-torque, hoist-type, weather-proof motor is an integral part of the unit. Two sizes of 5,000 or 10,000 lbs. rope pull at 40 ft. per min. WEBSTER Drum-Type Car Pullers also available in sizes from 7½ up to 50 hp. Write for literature.



Webster IDLERS

Job-Designed for Top Performance

Perfect and permanent roll alignment, economical operation, and minimum maintenance are built-in characteristics of WEBSTER Idlers. The balanced steel rolls have rounded edges which protect the belt and securely lock in the malleable iron roll ends. Timken tapered roller bearings are oversize to meet overloading and constant operation. Labyrinth seals of metal and felt keep grease in and dirt out. All parts interchangeable. WEBSTER Idlers will help you keep material handling costs down. Write for literature.



Webster CHAINS

Quality-Built for Long Service

For over eighty-two years WEBSTER has manufactured a complete line of standard and specialized cast and steel chains and chain attachment links for use in all industries. WEBSTER chain types include Pintle, Ley Bushed, Combination, Roller, Drag, Bevel and Roller Top Transfer. Our engineering department offers its experience and suggestions concerning designs and the adaptability of chains for meeting your needs. Write for catalog.

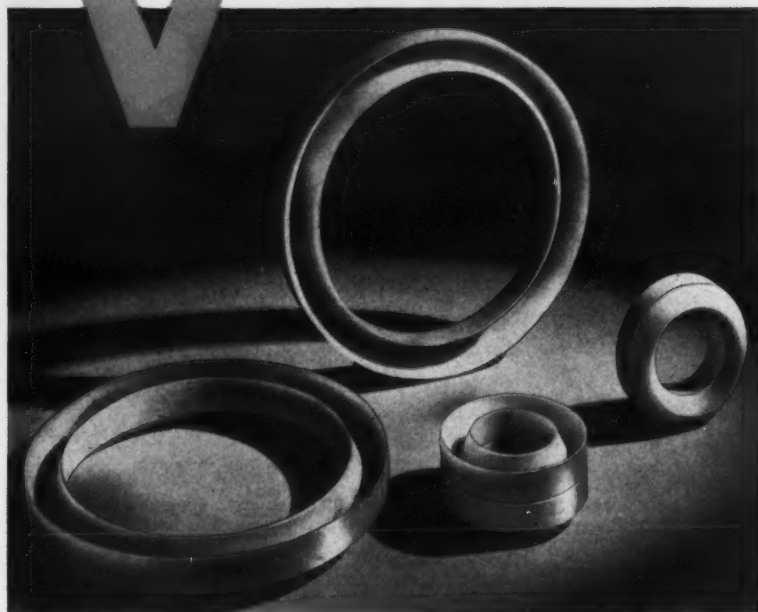


WEBSTER MANUFACTURING, INC.
DEPT. C - 108
TIFFIN, OHIO
Offices in All Principal Cities



Check 1934 opposite last page

V-PACKINGS



for every process need

● TEFLON* CHEMICAL PACKINGS

Belmont TEFLON Packings outlast other packings many times over in corrosive service. Good for all chemicals. Distinctive Tapered V design offers great flexibility and resiliency. Provides necessary seal at low gland pressure, reducing torque required to operate valve—imposes less load on reciprocating pump pistons. Catalog T-57.

● BEL-VEE GENERAL PURPOSE PACKING

The "Pressure-Sealing" V-Ring packing that expands toward rod and stuffing box wall on pressure stroke to automatically form the seal—and relaxes when pressure is released to allow free movement with minimum friction.

For all reciprocating rods and valve stems handling water, oil, solvents, steam, air and gas. Catalog 56.

*du Pont Trademark

The Belmont Packing & Rubber Co., Butler & Sepviva Sts., Phila. 37, Pa.

BELMONT

Check 1935 opposite last page

HANDLING & PACKAGING

Protects outdoor storage of bulk materials

Compound easily applied
with spraying equipment

Uses: Coats outdoor storage piles of bulk materials to prevent loss from wind or rain erosion.

Features: Formed crusts are said to reduce serious economic losses each year through disappearance of large tonnages of valuable material. Compound can be easily applied with any type of spray equipment. Special additives are included to provide proper wetting, penetration, and coverage of surfaces of even smallest particles on storage pile.

Description: Solution is a blend of synthetic organic, long-chain polymers in a water base that forms thin crust which is tough, durable, and highly resistant to weathering. In a series of heavier concentrations, solution is suitable for coating stockpiles of bauxite, carbon, chromite, concentrations, fluorspar, ilmenite, silicon carbide, sulfur, and many other types of materials.

Compound is inert, unreactive, and non-toxic. It has no adverse effect on burning qualities of coal or the subsequent processing of sulfur, metal ores, carbon, etc.

Solution is supplied in number of different grades ready for spraying at rate of one gal of spray per 100 sq ft of surface. Color indicator may be included to show where treatment has been made.

(Compound SP is product of Johnson-March Corp., 1726 Chestnut St., Philadelphia 3, Pennsylvania.)

Check 1936 opposite last page.

Tractor applications

Booklet of eight pages which describes line of excavator-loader tractors and attachments also illustrates and discusses wide variety of applications. Form DE822—Caterpillar Tractor Company, Peoria, Illinois.

Check 1937 opposite last page.

G-W OSCILVEYOR moves bulk materials



In the Oscilveyor three weights revolve in opposite directions to "blend" centrifugal forces and put all vibration to work. With this unique principle, you get faster forward motion of chips, shreds, pellets, and similar free-flowing material at the lowest possible cost for power and maintenance. Speed is adjustable.

Rubber-mounted rocker arms and closely calibrated coil springs make operation smooth, quiet. Rubber pad mounts need no lubrication or maintenance.

Other Oscilveyor features include:

- No floor shock, because all vibration is localized and rubber-insulated. No need for heavy floor mountings!
- Reduced particle breakage, because movement is gentle.
- No spillage or leakage, because forward movement is smooth, efficient, uniform.
- Fast material flow up to 50 ft. per minute, horizontal, incline, or decline.

Oscilveyor units can be assembled to any desired length. One drive unit powers 100 ft. Available custom-built for sanitary, ultra-abrasive, or high-heat handling. Write for details.

GIFFORD-WOOD CO. HUDSON, N. Y.

Branches in
New York, Cleveland, Chicago, St. Louis
Makers of Conveying Systems and
Equipment • Ice Handling Equipment
• Commercial Kitchen Machinery
• Eppenbach Homogenizers and
Colloid Mills



Gifford-Wood Co. Hudson, N. Y.

Please send me complete details on the Oscilveyor, plus G-W's "Idea Book" on materials handling.

Name & Title _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 1938 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

Big appetite for paper

Statistically, each person in the US uses one envelope daily. Total annual consumption is nearly 60 billion and requires 350 thousands tons of paper. Census Bureau figures show we use over 7 million tons of newsprint a year, more than twice that weight of paperboard. And another 12 million tons go into other uses. (Silicate P's & Q's, Philadelphia Quartz Company)

Defrosting speedup

A non-poisonous coating has been developed by Richard H. Goms of St. Paul, Minn., for making refrigerator defrosting much faster and easier. It reduces frost adhesion on refrigerated surfaces and is made from peanut oil, coconut oil, aluminum stearate, and a propylene glycol. Wiped on, it lasts for five defrosts. (D&O News, Dodge & Olcott, Inc.)

For more information on product at right, specify 1939 see information request blank opposite last page.



Toe pressure for forward . . . Heel pressure for reverse . . . Smooth, accurate "inching" . . . Response is instantaneous! Unique method of instant power application introduced in Towmotor Fork Lift Trucks

NEW! America's first foot-controlled power transmission!

Towmostatic Drive is a Towmotor engineering achievement based on the principle of Hydrostatics . . . an entirely new method of pedal-controlled power transmission that simplifies lift truck operation, reduces hand movements to minimum, cuts maintenance costs and downtime sharply!

With this new drive Towmotor lift truck operators control *all forward and reverse travel* with their left foot on a treadle-type pedal—a natural heel-and-toe action. To go forward, simply press down with toe. To reverse, press down with heel. Response is instantaneous and glider-smooth operation is easily mastered with a few minutes' practice!

Conventional mechanisms eliminated
Towmotor Towmostatic Drive is the first method of power transmission to eliminate clutch assembly, transmission, drive line,

differential, plus entire shifting mechanism. Many of the major causes of costly maintenance and downtime are thus *eliminated!*

Operating benefits are many
Smooth, accurate "inching" that simplifies stacking of goods is also obtained through Towmotor Towmostatic Drive. Maneuverability is unsurpassed—acceleration fast—gradeability greatly improved—lifting speed is integrated with drive control for maximum mass-handling.

Write for Towmostatic Drive Booklet.
Towmotor Corporation, Cleveland 10, Ohio.



It's really history-making!
NO clutch assembly
NO transmission
NO drive line
NO differential
NO shift mechanism



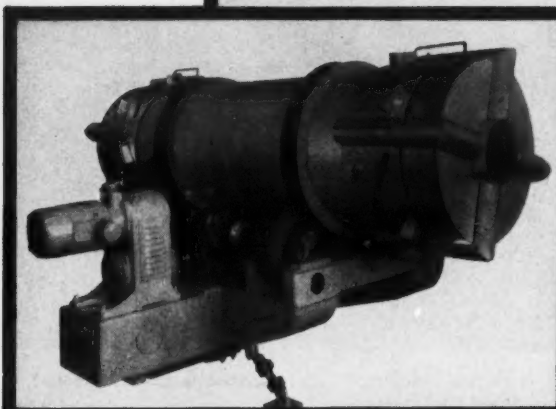
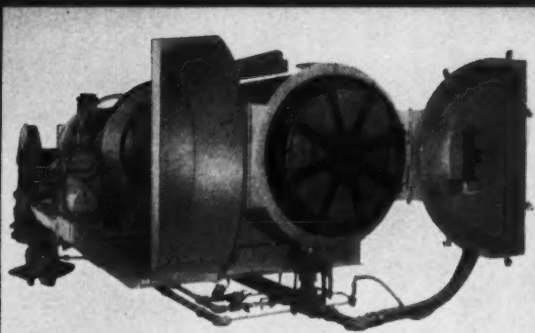
*Gerlinger Carrier Company is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

RENNEBURG

PROCESS EQUIPMENT

for the Chemical Industry

Special
Renneburg
gas-fired
indirectly-heated
stainless steel
Batch Dryer
for calcining
Urea product.



Renneburg
Rotating Batch
Reactor for
starch-dextrine
material. Has
quick-opening
ends, rubber tire
drive and
hydraulic tilting
mechanism.

SERVING THE
PROCESS
INDUSTRIES FOR
OVER 80 YEARS



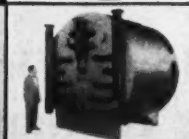
DRYERS
(Air & Steam)



COOLERS



COMBINATION AMMONIATOR-GRANULATORS



FURNACES



COOKERS



REACTORS



PRESSES



PILOT PLANTS

KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS* • GRANULATORS*
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS

*TVA Licensed Manufacturer

Literature and information on request

Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

Check 1940 opposite last page



recent books

reviews of current technical and reference work
... summarized for you by authorities in the
field with the CP staff

Fluorocarbons

This first book on fluorocarbons is the sixth in the Reinhold plastics applications series. Written by Merritt A. Rudner, Enflo Corporation, Maple Shade, New Jersey, 238-page text covers properties, chemistry, processing and fabrication techniques, and final applications of fluorocarbons. Case histories are offered to emphasize benefits derived from their use in solving problems in electrical, mechanical, and chemical applications. Future applications are discussed from the standpoint of present trends.

Technical data are reliable but not all-inclusive. They are intended to assist in efficient utilization of fluorocarbon materials and cover their capabilities and limitations. Charts, tables of processing data, and illustrations are used profusely. Material is presented in a semi-technical manner so that a chemical education is not necessary for understanding.

To obtain "Fluorocarbons", remit \$5.75 direct to Reinhold Publishing Corp., 430 Park Avenue, New York 22, N.Y.

leagues in London, England, technical institutions, this 309-page volume has been written for the biochemist, but it will also be of value to those who use chromatography in organic and agricultural chemistry.

Details are given for preparation of solvents and location reagents of proved usefulness. One chapter is devoted to desalting. Other chapters deal with preparation and interpretation of chromatograms of amino acids, indoles, sugars, and so forth. References to chromatographic methods have been kept to a minimum whereas references to applications have been made as full as possible.

To obtain "Chromatographic Techniques: Clinical and Biochemical Applications", remit \$6.75 direct to Interscience Publishers, Inc., 250 Fifth Ave., New York 1, New York.

Check 1941 opposite last page.

Phenolic Resin Chemistry

Devoted to the chemistry of the phenol-formaldehyde reaction, this 323-page volume by N. J. L. Megson should be of great assistance to many who are newly-entering the field of phenolic resin chemistry.

Emphasis is almost entirely on pure chemical investigations; technological aspects have been virtually ignored. Great attention has been devoted to details of experimental evidence previously available only in the original papers from most of the leading workers in the field.

To obtain "Phenolic Resin Chemistry," remit \$10.80 direct to Academic Press Incorporated, 111 Fifth Ave., New York 3, New York.

Check 1942 opposite last page.

Chromatographic Techniques

In the midst of the feverish activity in chromatography, here is a practical book which attempts to bring together in concise form the methods and techniques, tried and tested, already in use. The author's purpose has not been to discuss the history and theories of chromatography. Instead, he describes a simple apparatus which, by related techniques, can be used successfully to separate a wide range of compounds. Edited by Ivor Smith and authored by Dr. Smith and many of his col-

Effects of Radiation on Materials

This 355-page book discusses changes that nuclear radiation produces in metals, alloys, inorganic dielectrics, semiconductors, organic and polymeric materials, and materials for nuclear reactor components.

The book consists of series of papers delivered at a three-day colloquium on radiation effects. The meeting, held in March 1957 at Johns Hopkins University, was jointly sponsored by the Office of Naval Research and The Martin Company.

Twelve authors analyze the results of their own experiments. Theories and concepts of radiation effects, radiation sources and measurements of radiation, and known effects of radiation on physical, metallurgical, mechanical, corrosion, and electrical properties are presented.

Book also includes discussions on behavior of organic materials, including effects of radiation on polymeric reaction processes. A 33-page bibliography lists 779 items of literature on radiation.

Amplly illustrated with charts, tables, graphs, and photos, the book is recommended for all engineers and scientists interested in this subject.

To obtain "Effects of Radiation on Materials" remit \$10.50 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York.

Principles and Practice of Flow Meter Engineering

Written as a textbook, yet arranged so that it can be used as a handbook, eighth edition of L. K. Spink's text on flow meter engineering covers a much broader scope than earlier editions.

The 549-page volume covers the entire field of flow measurement, including subjects as history of developments in flowmetering, the theory of flow meters, use

and installation of primary devices, meter mechanisms, and liquid, steam and gas flow measuring practices. Representing over 30 years of cumulative research and experience, this latest edition uses current AGA and ASME terminology.

An excellent bibliography provides material for study to satisfy students who wish to delve more deeply into the subject. Electronic computers have been used to provide many new tables. Curves have been replotted to provide greater convenience or to cover new data.

To obtain "Principles and Practice of Flow Meter Engineering" remit \$15.00 direct to The Foxboro Company, Foxboro, Mass.

Check 1943 opposite last page.

Surface Active Agents and Detergents

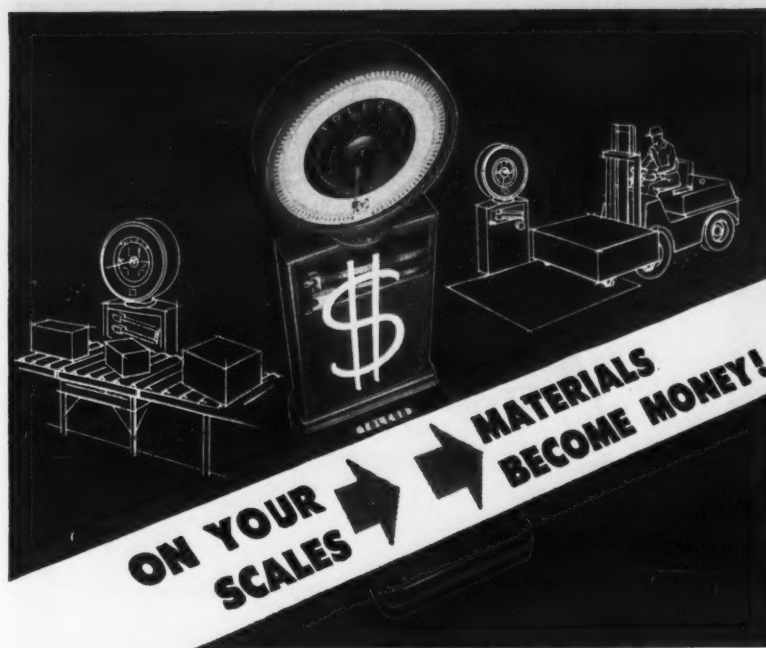
Vol. II

This is Volume II of a two-volume set by authors Anthony M. Schwartz, James W. Perry, and Julian Berch on surface active agents. Volume I was written to cover the field up to the beginning of 1947. Volume II is devoted to developments during the period 1947-1956. Amount of published material represented in volume II exceeds by a wide margin the amount of material forming the basis for volume I.

In this 839-page text, the authors treat processes for synthesizing and manufacturing surfactants, special function surfactants and compositions, physical and colloidal chemistry of surfactants in theory and practice, and practical application of surfactants. The volume will serve as a valuable review. Many literature and patent references are given.

To obtain "Surface Active Agents and Detergents Vol II," remit \$17.50 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York.

Check 1944 opposite last page.



It will pay you to check now on weighing efficiency in your plant!

Efficient weighing is a prime requirement for proper cost control. Weight records directly affect costs, quality, inventory control and customer billing. You can avoid weighing errors and inadequate weight data by placing the right scales in the right places . . . all properly integrated in a *plant-wide weighing system* to supply basic accounting records on materials received, transferred and shipped.

You can easily check up on the job your scales are now doing. Just ask for the exclusive Toledo Weight Fact Kit. A Toledoman will gladly explain how it will help you detect and correct weighing inefficiencies in your plant. **REQUEST YOUR WEIGHT FACTKIT NOW.** No obligation. Address Toledo Scale, 1423 Telegraph Rd., Toledo 12, Ohio.



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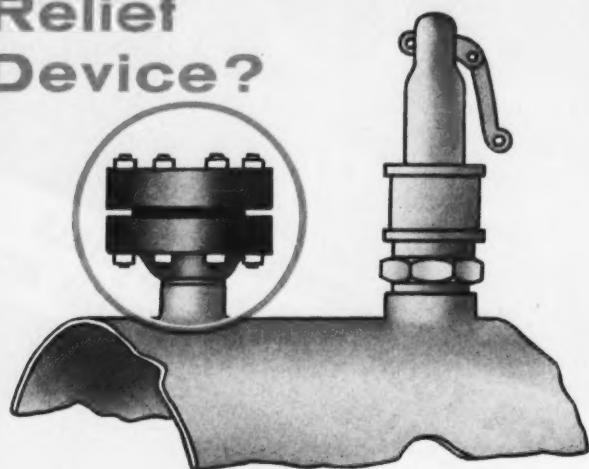
HOPPER
SCALE



REMOTE
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WEIGHT
RECORDING

Check 1945 opposite last page

Why The "Standby" Relief Device?



The BS&B Safety Head Takes Over Under Abnormal Conditions

Your relief valve may need a helping hand. The double protection provided by this relief valve - BS&B Safety Head combination is ideal when —

- The nature of the pressurized fluid may cause malfunction of relief valve.
- Instantaneous over-pressure occurs due to abnormal heat or regulating conditions.

When pressure-relief requirement is greater than the discharge capacity of the valve, the BS&B Safety Head provides an instantaneous, unrestricted opening.

Thousands of pressure systems are now protected with the added security of BS&B Safety Heads.

BS&B Engineers will be glad to evaluate your pressure system for application of the correct BS&B Safety Head.



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Kansas City 26, Missouri
Telephone: 8Enton 1-7200



RECENT BOOKS

Oral Communication of Technical Information

If you'd like help in the often vexing problem of talking science to laymen, you'll no doubt find it within the 200 pages of this useful handbook for speakers in the technical field. Of particular interest, is one valuable section which reviews the most common errors in the speech-writing of chemists and engineers.

In a "how-to" manner, the author, Robert S. Casey, has assembled methods of effective speaking for almost all situations — beginning with the fundamental barriers and bridges to oral communication, and proceeding to the actual problems involved in making an effective speech, and how they are solved. Specifically, the book covers the organization of material, composition, delivery of formal and impromptu speeches, and the use of mechanical aids such as recordings and slides.

Further "how-to" tips cover such oral communications as presiding at meetings, giving technical legal testimony, and social conversation. Although emphasis is placed on the special needs of technical subject matter, the techniques of organization and delivery apply to all speech-making situations.

To obtain "Oral Communication of Technical Information", remit \$4.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, New York.

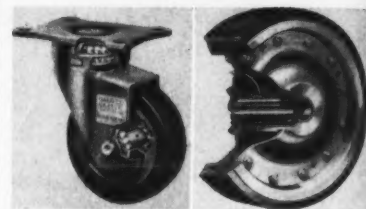
Automatic Process Control

Written by Donald P. Eckman, professor of instrumentation engineering at Case Institute of Technology, this 368-page volume treats the important principles of automatic control. Block diagrams are emphasized as are frequency techniques in process control. The book begins with process analysis and carries on into the generalized behavior of close-loop systems. System problems are given a great

It makes sense to standardize on

DARNELL
CASTERS AND WHEELS

- Rugged Trouble-Free Performance
- Minimum Maintenance
- Many Extra Years of Service



Types and Sizes for Every Use

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads,

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.



Write...for this
valuable NEW



Consult the Yellow Pages

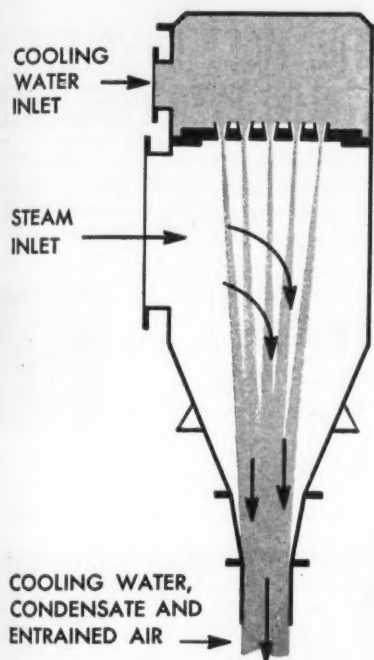
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Check 1946 opposite last page

Check 1947 opposite last page

CHEMICAL PROCESSING

How to CONDENSE STEAM and PULL A VACUUM with nothing but **WATER**



I-R Ejector-Jet Barometric Condensers provide low-cost condensation and evacuation wherever there is an ample supply of clean cooling water and the condensate need not be reclaimed. Since no air-removal equipment is needed, they are ideal for use where extreme simplicity of operation and low first cost are desired. Typical applications include steam turbine, vacuum pan and evaporator service.

In operation, water at atmospheric pressure or slightly higher enters at the top and is injected into the steam space through nozzles which form high-velocity jets. As the steam is condensed, air and gases are entrained by the water and carried to an open hot well. A valve in the water line is the only "control" needed.

Disc-flow type units are also available.

Send for Bulletin No. 9012-A



Ingersoll-Rand
4-780 11 Broadway, New York 4, N. Y.

Check 1948 opposite last page

OCTOBER 1958

RECENT BOOKS

deal of study in detail.

Techniques of control analysis are described. Sufficient detail is presented concerning the techniques that some of the more difficult problems in automatic process control can be examined closely. Professor Eckman incorporates numerous problems with answers and nine detailed experiments including one on the analog computer.

Special topics include new electronic controllers, control elements and actuators, non-linear elements, Nyquist and Bode diagrams, fluid and thermal process control, computer optimizing control, direct comparison of control actions.

To obtain "Automatic Process Control," remit \$9.00 direct to John Wiley & Sons, Inc., 440 Fourth Ave., N.Y. 16, N.Y.

Check 1949 opposite last page.

Modern Chemical Processes Volume 5

Fourteen chemical processes are described in detail in this 154-page book. This is the fifth volume in a series that covers modern production methods in the American chemical industry.

Descriptions include history, economics, design and operation details, plant investment and amortization, and personnel. Each process discussed is an actual plant installation. Flow diagrams, photographs, tables, charts, and drawings are included.

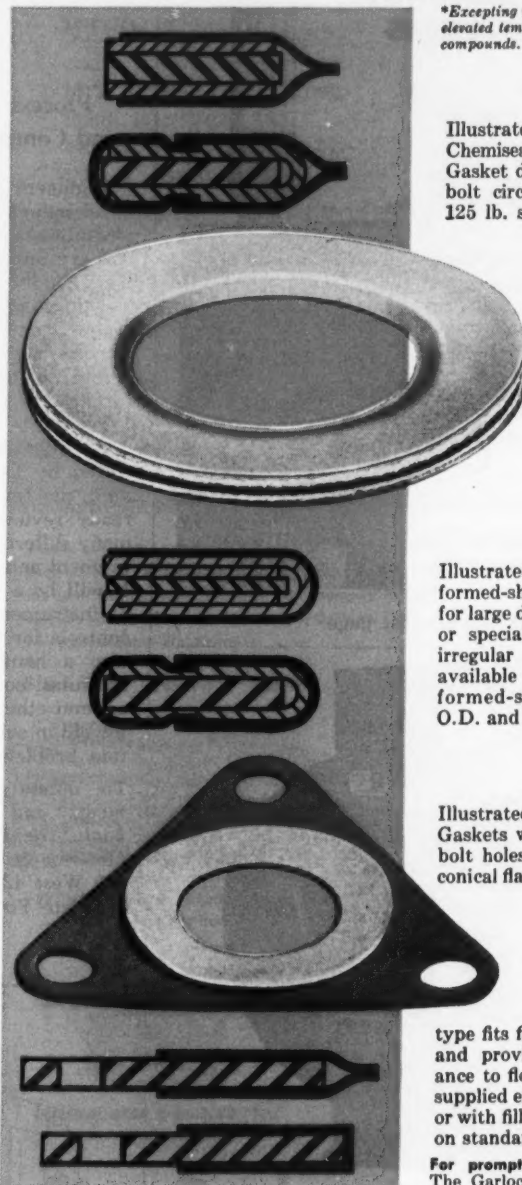
Included in this volume are the following processes: Elemental phosphorous by electric furnace, natural gas hydrocarbons for petrochemicals, tantalum, granulated fertilizers by continuous ammoniation, granulated triple superphosphate, gold processing, and uranium from gold wastes.

Also discussed are: directed interesterification of lard, boron chemicals from Searles lake brines, uranium recovery from wet process phosphoric acid, filtration-extraction of cottonseed oil, sulfuric acid from anhydrite, potassium borohydride manufacture, and

Chemiseal® Gaskets

... with protecting Jackets of du Pont TEFLON, are impervious to all known chemicals*. They are made with a variety of filler constructions to suit every connection problem—every pipe and nozzle material requirement—whether glass, ceramics, stainless, Karbate, Haveg, glass-lined steel, etc. That is why Garlock 8764 Chemiseal Gaskets have become the standard choice of the process industries.

*Excepting molten alkali metals, fluorine at elevated temperatures and complex halogen compounds.



Illustrated at left is the standard Chemiseal slit-envelope Ring type Gasket designed to fit inside the bolt circle of flanges drilled to 125 lb. standards and made for all standard pipe sizes up to 10" I.D. Stocked for all Pfaudler and Glas-cote standard nozzle sizes from 1½" to 10" I.D.

Also available as shown with double jacket protecting O.D. as well as I.D. against corrosion.

Illustrated at left is Chemiseal formed-shield Ring type Gasket for large diameter glass-lined steel or special material nozzles and irregular shaped openings. Also available as shown with double formed-shield protecting both O.D. and I.D.

Illustrated at left are Chemiseal Gaskets with full face filler with bolt holes, for standard Corning conical flanges. These gaskets seal with unusually low bolt loads. Shown are both slit-envelope and milled-envelope types.

Milled-envelope type fits flush with the pipe I.D. and provides minimum impedance to flow. This type Jacket is supplied either with full face filler or with filler to fit inside bolt circle on standard 125 lb. flanges.

For prompt service, contact one of The Garlock Packing Company's 80 sales offices and warehouses throughout the U.S. and Canada, or write for Bulletin AD-154.

United States Gasket Company
Camden 1, New Jersey

**United
States
Gasket**

Plastics Division of
GARLOCK



Check 1950 opposite last page

NEW-TYPE CHECK VALVE PROTECTS AGAINST OVERRANGE LOSS...

of any manometric fluid

DOES NOT AFFECT INSTRUMENT ACCURACY OR RESPONSIVENESS

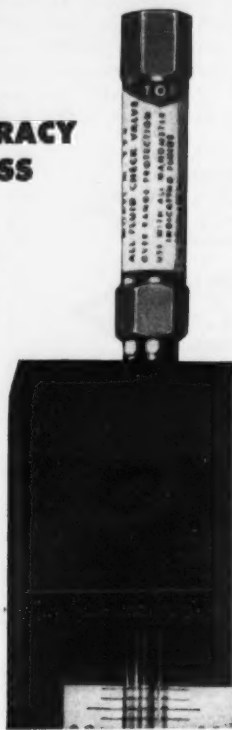
Based on a new design principle, the Meriam M-224 Float Check Valve effectively prevents loss of manometer indicating fluid due to overrange, either sudden or creeping. It is small and compact enough for mounting on multiple-tube units, will handle any manometric fluid.

Tested for more than 20,000 cycles without a single failure, the valve will not cause "air block" or affect manometer accuracy. Rugged, corrosion-resistant construction throughout assures long-life serviceability.

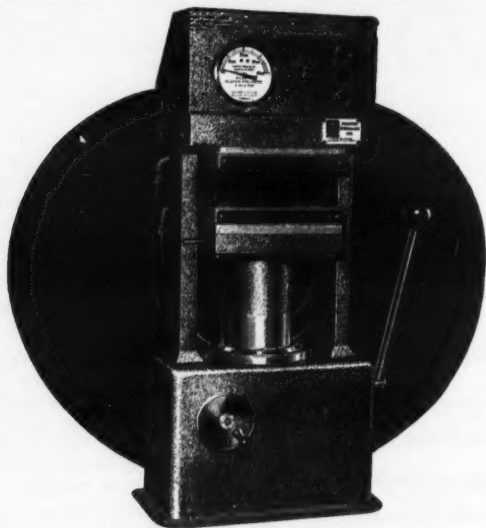
In the lab or on the process line, the M-224 Float Check Valve is an essential accessory for all critical manometer applications.

WRITE FOR BULLETIN A-10

The MERIAM Instrument Co.
10920 Madison Ave., Cleveland 2, Ohio
B.A. 1778



Check 1951 opposite last page



If you need a hydraulic bench press for any purpose in the field of rubber moulding, plastic, laboratory testing or graphic arts, write for circular or if you prefer we'll have our nearest representative call on you...

Φ PHI PRESS formerly Preco
PASADENA HYDRAULICS, INC.

1430 Lidcombe

El Monte, California

Check 1952 opposite last page

RECENT BOOKS

dualayer gasoline process to remove mercaptans.

To obtain "Modern Chemical Processes — Volume 5", remit \$5.00 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N.Y.

Process Instruments and Controls Handbook

Engineers and technicians in all industries where instrumentation and automatic control are important will find in this handbook an organized and thorough treatment of operating and design fundamentals of measurement and automatic control systems used in the process fields.

Prepared by a staff of instrumentation specialists and edited by Douglas M. Considine, the text will serve as a ready review of principles of many different types of measurement and control processes. It will be a guide to selection of instruments and automatic controls for specific jobs. It is also a handy compilation of formulas, constants, and critical and other engineering data for aid in solving instrumentation problems.

To obtain "Process Instruments and Controls Handbook," remit \$19.50 direct to McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, New York.



"He used to work in a
lumber camp."



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Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

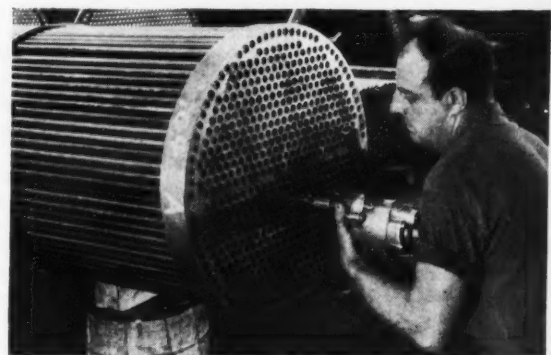
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Check 1953 opposite last page



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Republic ELECTRUNITE® Stainless Steel Tubes bend without wrinkling, slide effortlessly into tube sheets, roll-in and expand evenly. ELECTRUNITE is produced from highest quality flat-rolled electric furnace steel, carefully checked for chemical analysis, physical properties, exact thickness and width. Each ELECTRUNITE Stainless Tube is fully solution annealed for maximum corrosion resistance. Call your Republic ELECTRUNITE distributor. Send for free 60-page brochure. Write today!



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Check 1954 opposite last page

CHEMICAL PROCESSING



new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Flow element guide

Pocket-size 16-page folder is designed to assist in selecting proper differential producer for flow metering. Features of manufacturer's differential producers are included. Bul 100-P5-A — Builders-Providence, Inc., Div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I.

Check 1955 opposite last page.

Lists organic chemicals

Booklet of 28 pages lists more than a dozen organic chemicals such as glycols (ethylene, diethylene, triethylene, and polyethylene), glycol ethers, ethanalamines, and surfactants. "Organic Chemical" — Organic Chemicals div., Olin Mathieson Chemical Corp., One Park Ave., New York 16, N. Y.

Check 1956 opposite last page.

Bucket elevator quick pick

Bulletin of 36 pages describes manufacturer's industrial bucket elevator line and includes simplified selection data which makes proper choice of this equipment a quick and easy matter. Bul 5784 — Chain Belt Company, Milwaukee 1, Wis.

Check 1957 opposite last page.

Nuclear reactor valves

Bulletin of four pages describes and illustrates group of solenoid valves developed for primary and secondary systems of nuclear water cooled reactors. "Valves for Nuclear Reactors" — Automatic Switch Co., Florham Park 1, New Jersey.

Check 1958 opposite last page.

Acrylic paint surveys

Booklet of ten pages (C-35), based on lectures prepared for University of Florida's 1958 Short Course in Paint Technology, covers acrylic emulsion paints for exterior masonry. Booklet of 30 pages (C-36) outlines technology of acrylic latex paints for interior use. It is based on five years of formulating and manufacturing experience with acrylic paints. Booklets C-35 and C-36 — Rohm & Haas Company, Washington Sq., Philadelphia 5, Pa.

Check 1959 opposite last page.

Discusses waste disposal

Questions pertinent to radioactive waste disposal are discussed in 22-page brochure which outlines company's consulting services to operators of nuclear power plants. Radiological safety, as well as capital and operating cost savings are emphasized. "Think of Waste Disposal Processes Today" — Nuclear Science and Engineering Corp., Section 3-P, PO Box 10901, Pittsburgh 36, Pa.

Check 1960 opposite last page.

Solvent versatility

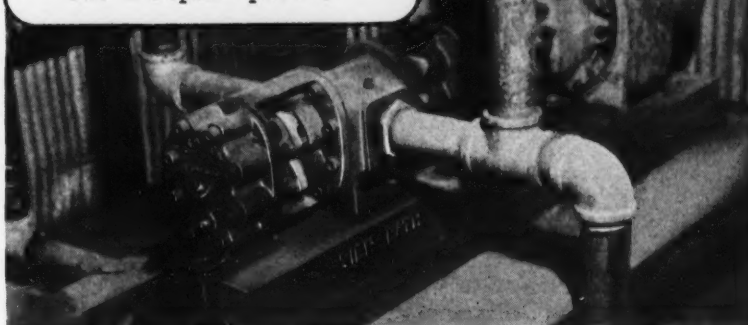
Use of isobutyl acetate in lacquer solvent systems is described in eight-page bulletin which compares isobutyl acetate with other principal medium-boiling solvents. Included is comprehensive chart comparing the effect of each of these solvents upon solution viscosities of formulations containing 13 different polymers. Bul M-101 — Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., Kingsport, Tenn.

Check 1961 opposite last page.

"Most trouble-free Pump we ever used!" reports

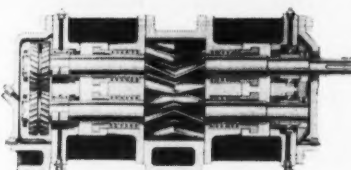
LOUISVILLE VARNISH COMPANY

"Other pumps lasted only 6 months... the Sier-Bath Gearex Pump has been in service 7 years without a repair part".

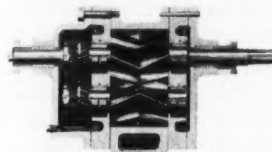


• This external gear and bearing Sier-Bath Gearex Rotary Pump unloads lacquer thinners such as Xylol, Acetone and Toluol from tank cars and trucks; also transfers them within the tank storage area. Materials are pumped at 70 to 90 gpm., operating with a 10 foot suction lift against 30 to 40 ft. head. Only servicing is annual gland repacking required by company routine maintenance.

Sier-Bath "Gearex" Pumps



EXTERNAL GEAR & BEARING TYPE
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow . . . quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. See "Yellow Pages" for your local Sier-Bath Pump Representative or send for Bulletin G-2. Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.

Sier-Bath ROTARY PUMPS



Screw Pumps

Gearex® Pumps

Hydrex® Pumps

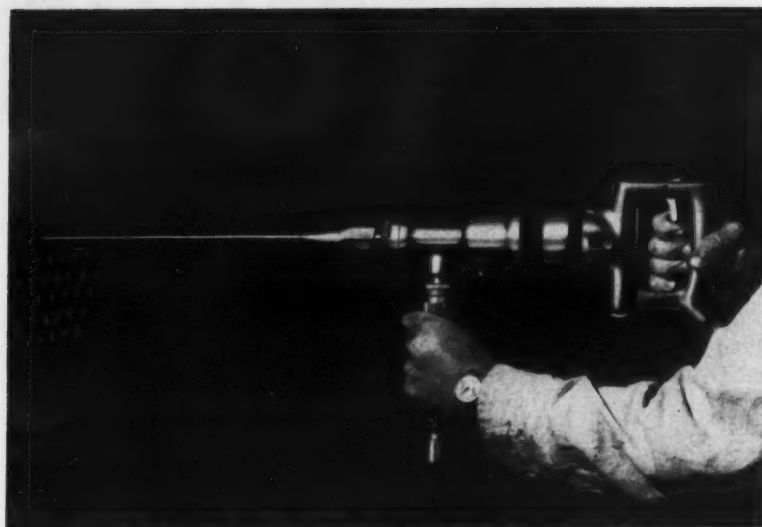
Founded 1905

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. O. M. A.

Check 1962 opposite last page

**CLEAN TUBES QUICKLY...
EASILY...
THOROUGHLY...
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**ONE-MAN-OPERATED
AIRETOOL
Condenser Cleaner**

Get equipment back in service faster . . . reduce overhaul costs with this efficient operating AIRETOOL Condenser Cleaner CC-475. It's extremely lightweight . . . only 10 lbs. . . made for one-man operation . . . no cumbersome supporting rig needed. Rugged, high speed AIRETOOL motor efficiently drives cutting tools through the most severely clogged tubes up to 1" diameter. Built-in flushing system keeps drill cool and removes debris. Balanced design . . . convenient handle and accurate trigger valve control promotes fast, easy operation . . . less operator fatigue. For cost-cutting efficiency, include this AIRETOOL Condenser Cleaner in your tubular maintenance program.



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EUROPEAN PLANT: Vlaardingen, The Netherlands.
CANADIAN PLANT: 37 Spalding Drive, Brantford, Ontario.

Check 1963 opposite last page

NEW LITERATURE

Shows truck in action

Folder of four pages describes 4000-lb capacity electric-powered fork truck and illustrates the unit in action. Specifications and information on operation are included. Model F-30T4 Folder — The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio. Check 1964 opposite last page.

Synthetic egg yolk

Suggested formulas for using synthetic egg yolk in manufacture of about forty different types of leather are contained in 16-page booklet "Synova" — Seaboard Chemicals, Inc., 30 Foster St., Salem, Massachusetts.

Check 1965 opposite last page.

Describes relief valves

Features of multiple disc relief valves for steam systems are described in eight-page bulletin that also presents specifications for vertical, horizontal, and angle styles. Installation diagrams and selection data are included in Bul 5200-A — Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia 32, Pa.

Check 1966 opposite last page.

Woven wire slings

Advantages, typical uses, and technical data on woven wire slings are provided in illustrated 24-page catalog. Woven Wire Slings cat — The Cambridge Wire Cloth Co., Cambridge, Md.

Check 1967 opposite last page.

Spectrophotometers

Brochure of six pages graphically shows in chart form all accessories, sample compartments, and component parts of Beckman Model DU Spectrophotometer. Lab Guide No. 2 — Will Corporation, Rochester 3, New York.

Check 1968 opposite last page.

Advantages of Teflon

Illustrated bulletin of four pages describes many of the chemical, thermal, mechanical, and frictional advantages of Teflon and reinforced Teflon bearings, gaskets, packings, and rings. Bul CT-1 — Sirvene Div., Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago 22, Ill.

Check 1969 opposite last page.

Colloidal dispersions

Answers to many of the questions frequently asked about colloids, illustrated with drawings and pictures, are contained in 12-page booklet "The ABCs of Colloidal Dispersions" — Acheson Colloids Co., Div. of Acheson Industries, Inc., Port Huron, Mich.

Check 1970 opposite last page.

Motor application guide

Designed to make motor selection easy, manufacturer's 12-page application guide includes chart providing information on typical driven equipment, character of loads, and starting and running torques. Form 270 — Century Electric Co., 1806 Pine Street, St. Louis 3, Mo.

Check 1971 opposite last page.



"Old Boggs is showing off again."

NEW LITERATURE

Pigment no figment

No figment of the imagination but one of the best all-round pigments for industrial finishes, according to manufacturer, is its titanium dioxide, low-oil-absorption rutile pigment featured in company publication "Pigment News" Vol. 3, No. 2 — Pigments Div., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, New York.

Check 1972 opposite last page.

Storage battery racks

Simplified maintenance and maximum deliverable voltage are cited as principal advantages realized from using steel storage battery racks. Catalog of 12 pages includes practical tips on selecting the best rack. Storage battery rack cat — Exide Industrial Div., The Electric Storage Battery Co., Box 8109, Philadelphia 1, Pennsylvania.

Check 1973 opposite last page.

Government spec guide

All manufacturer's products complying with U.S. government specs are in 12-page booklet. Bul GSD-1 covers adhesives, coatings, sealers and vinyl tubings, and paint ingredients — The Borden Chemical Co., a division of The Borden Company, Government Services Dept., 350 Madison Ave., New York 17, New York.

Check 1974 opposite last page.

Titanium welding

Do's and don'ts for successful titanium welding are outlined in 32-page handbook which covers in detail fusion-welding equipment and procedures, resistance-welding equipment and procedures, a study of typical weldments, and methods for evaluating weld quality. Bul 6 — Titanium Metals Corp. of America, 233 Broadway, New York 7, N.Y.

Check 1975 opposite last page.



Working wonders out of waste!

This quadruple-effect evaporator concentrates antibiotic liquids for E. R. Squibb & Sons, New Brunswick, N. J. Developed for the handling of streptomycin waste, it demonstrates Swenson's ability to help advance the production of new pharmaceuticals put into service for humanity.

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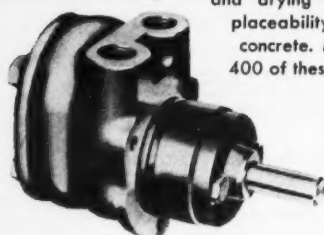
Check 1976 opposite last page

JOHNS-MANVILLE

Selects ROPER PUMPS for CEMENT ADDITIVES DISPENSER



The unit above, developed by Mooney Bros. Corp., Lodi, N. J., authorized Roper Pump distributor, is an inexpensive device that delivers accurately measured amounts of Johns-Manville liquid cement additives in the proper proportions. The J-M product, *Placewel*, is a liquid water-reducing, air entraining agent which, when added to concrete, increases strength, reduces segregation and drying shrinkage, while aiding in placeability and impermeability of the concrete. Mooney Bros. has built over 400 of these devices for Johns-Manville.



**ROPER SERIES K
PUMPS**
¾ TO 110 GPM
TO 150 PSI

In this instance, the flange mounted, ¾ GPM, Roper Series K Pump was selected to do the job. Roper Series K Pumps are rated from ¾ to 110 GPM, pressures to 150 PSI, with packed box or mechanical seal, and are compact in all sizes. They are ideally suited to general transfer work, pressure lubrication or hydraulic service when pumping clean liquids. Handling total suction lifts up to 25 feet, they are unusually quiet and operate with equal efficiency in either direction. For more data on the Roper line, send for bulletins today.

See Our Catalog in Sweet's and C. E. C.

ROPER HYDRAULICS, INC.
760 Blackhawk Park Avenue
Rockford, Illinois

ROPER
ROTARY PUMPS

Check 1977 opposite last page

NEW LITERATURE

It's in the bag

Illustrated bulletin of six pages details design, capacities, gravity or power feed operation, and discharge of automatic bagging scale. Bul 3749B — Richardson Scale Co., Clifton, N.J.

Check 1978 opposite last page.

Electric fork truck

Bulletin of six pages describes accessibility and maintenance features of battery-powered fork truck of 2000-lb capacity. Full dimensions, specifications, and performance characteristics are included. "Clark-lift Electric 20" Bul — Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Check 1979 opposite last page.

'Live storage'

The modern approach to "live storage" is described in eight-page folder which graphically shows point-of-use storage. Diagram of an average flow rack unit is included with features indicated. Form 16 — The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Check 1980 opposite last page.

Data on epoxy compounds

Bulletin of three pages on family of liquid epoxy-base resin compounds contains data chart of three selected resins showing comparative properties when used with five important hardeners. Bul 6040-1 — Houghton Laboratories, Inc., Olean, N.Y.

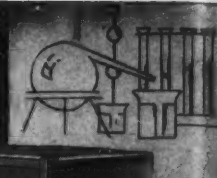
Check 1981 opposite last page.

Air, gas dehydration

Latest information on air and gas dehydration with silica gel is presented in text and graph form in 18-page Bul 202 — Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore 3, Md.

Check 1982 opposite last page.

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FOR MIXING:

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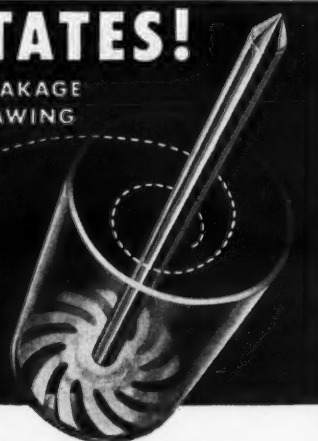
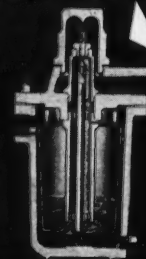
865 11th Street

Marion, Iowa

Check 1983 opposite last page

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- NO STEAM LEAKAGE
- NO WIRE DRAWING



TRERICE PATENTED STEAM TRAPS HAVE A ROTATING VALVE...ASSURING NO LEAKAGE DUE TO WIRE DRAWING

With every discharge, the valve in a Trerice trap seats in a different position... a new seat... a steam tight seat every time! Discharging water impinges on the impeller... causes rotating action.

EASIER MAINTENANCE

A Trerice trap can be inspected and cleaned without removing it from the line, or disturbing the high pressure bolts and gasket.

Removable cap permits quick access to valve and seat for inspection and maintenance.

FREE TRIAL OFFER

We'll supply one, a dozen, or more Trerice steam traps for your operation on a FREE 60-day trial basis. Act now! Write today for bulletin 1400D containing complete engineering data, valve and orifice charts.

H. O. TRERICE CO. 1420-B West Lafayette Blvd., Detroit 16, Mich.
Sales Offices in Principal Cities of U.S.A. and Canada

Check 1984 opposite last page

CHEMICAL PROCESSING

Highly refined salt

Company has announced entrance into diethylene glycol dimethyl ether field with four-page bulletin listing properties, applications, and specifications of an anhydrous reaction medium for organo-metallic reactions. "Poly-Solv D2M" bul — Organic Chemicals div., Olin Mathieson Chemical Corp., One Park Ave., New York 16, N.Y.

Check 1985 opposite last page.

Lift truck operating story

Covering company's series of lift trucks, bulletin of 16 pages tells engineering, design, construction, and operating story of the units. Bul BU-451 — Engine-Material Handling Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 1986 opposite last page.

Water-soluble resin

Carbopol 934 water-soluble resin for improved thickening, suspending, dispersing, and emulsifying is detailed in 24-page Bul 1257 — B. F. Goodrich Chemical Co., div. of The B. F. Goodrich Co., 3135 Euclid Ave., Cleveland 15, Ohio.

Check 1987 opposite last page.

Radiochemicals list

Manufacturer's handy price list of 24 pages covers radiochemicals and biochemicals. Price List, 1958 — Schwarz Laboratories, Inc., 230 Washington St., Mt. Vernon, N.Y.

Check 1988 opposite last page.

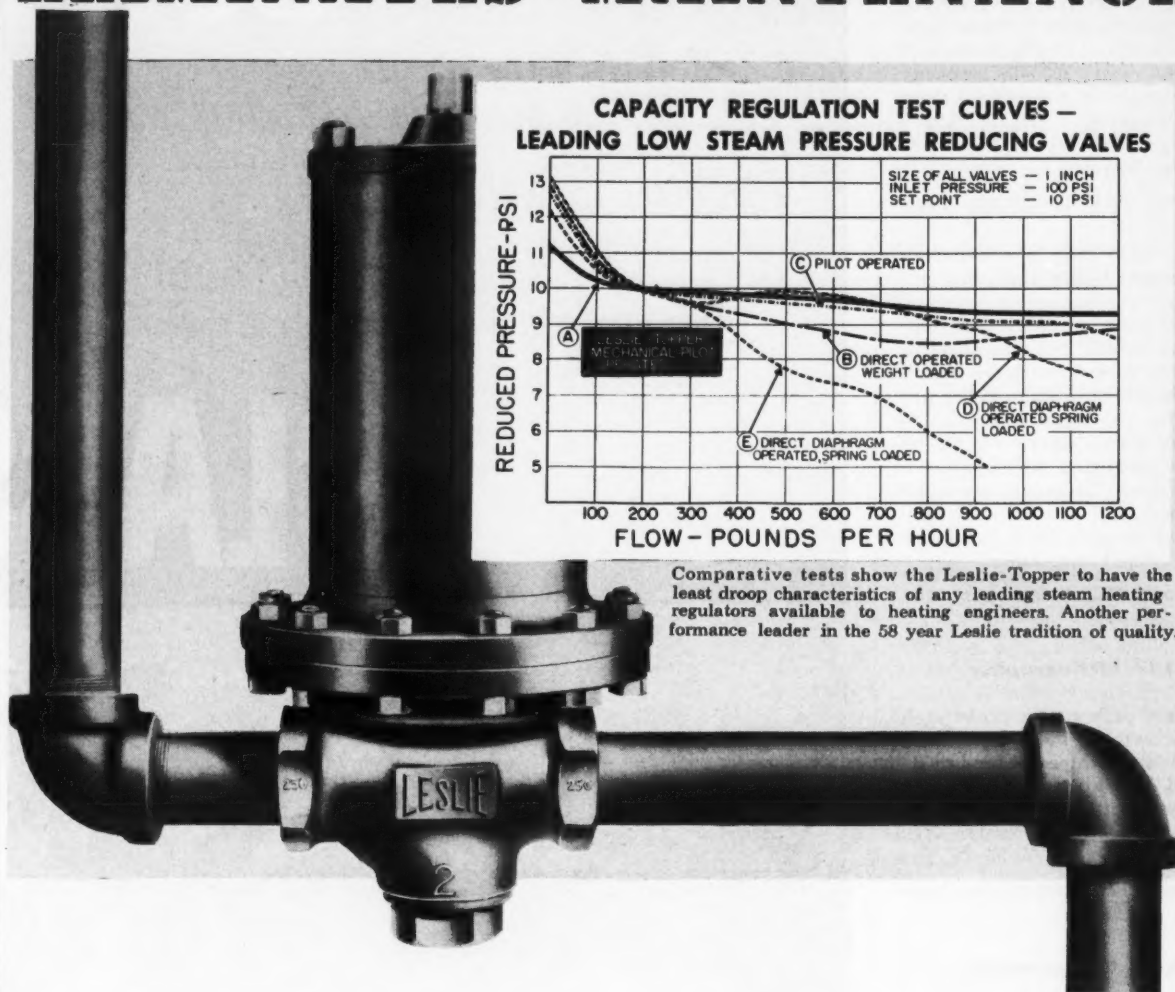
Chromatographs

Sixteen-page booklet featuring high-speed centrifugal chromatograph in full-color four-page section lists and describes laboratory equipment recently available. Review No. 8 — Arthur S. LaPine & Company, 6001 S. Knox Ave., Chicago 29, Ill.

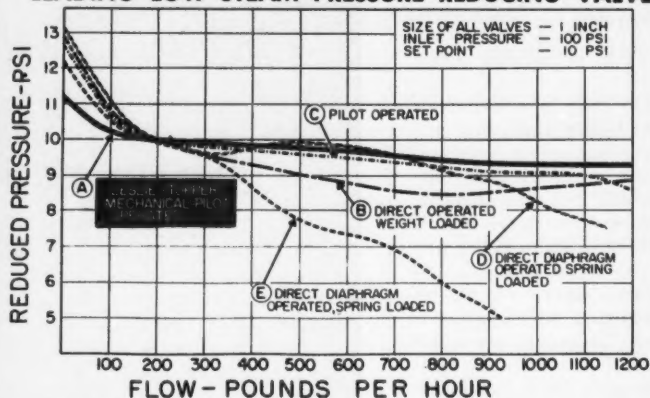
Check 1989 opposite last page.

revolutionary pressure reducing valve with mechanical pilot out of steam path

ELIMINATES MAINTENANCE



**CAPACITY REGULATION TEST CURVES —
LEADING LOW STEAM PRESSURE REDUCING VALVES**



Comparative tests show the Leslie-Topper to have the least droop characteristics of any leading steam heating regulators available to heating engineers. Another performance leader in the 58 year Leslie tradition of quality.

Now . . . a mechanical pilot operated reducing valve with direct operated simplicity and steam pilot accuracy . . . proven in comparative tests with other leading regulators a new concept in maintenance-free steam pressure reduction . . . the **LESLIE-TOPPER**

- Inlet pressures from 7 to 250 psi — reduced pressure ranges from 2 to 35 psi.
- Sizes $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1", $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", and 2".
- Piloting device entirely outside the path of steam.
- No dirt catching or close fitting parts — Use it for intermittent, continuous or standby service with complete confidence.
- Packless construction.
- Long life, long travel, metal diaphragm.
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- No auxiliary operating air required.

All of this adds up to new reliability, freedom from maintenance and shutdown time. All of these extra quality features are available at less initial cost than any steam pilot or direct operated regulator you would endorse with your specification.

Eliminate your steam heat reducing valve problems this year, this heating season; write now for all the facts, including complete capacity-regulation data — or phone your Leslie representative. You'll find him listed in your classified directory.



REGULATORS and CONTROLLERS

LESLIE CO., 281 Grant Avenue,
Lyndhurst, New Jersey

Check 1990 opposite last page

NEW LITERATURE

Lift truck purchasing

In addition to discussing the three important points to consider in lift truck purchasing, 12-page booklet analyzes various features of manufacturer's 1000- and 2000-lb capacity pneumatic-tired trucks. Hyster 20 Booklet — Hyster Company, 1003 Myers St., Danville, Illinois

Check 1991 opposite last page.

Efficient liquid shipping

Packaging approach for shipping liquids in a polyethylene bottle and corrugated box is covered in detail in manufacturer's liquid shipping report. Case history on use of this packaging development is included. Shipping container report — Hinde & Dauch Div., West Virginia Pulp and Paper Co., Sandusky, Ohio.

Check 1992 opposite last page.

G-11® bibliography

A six-page report presents 20 abstracts of literature on G-11® (hexachlorophene U.S.P.) and four abstracts of patents. Sindar® Reporter No. 2, 1958 — Sindar Corporation, 330 W. 42nd St., N. Y. 36, N. Y.

Check 1993 opposite last page.

Micro determinations

Laboratory equipment for micro chemical determinations is described in 12-page brochure. S/P Bulletin — Scientific Products Division, American Hospital Supply Corp., 1210 Leon Pl., Evanston, Ill.

Check 1994 opposite last page.

Redesigned motors

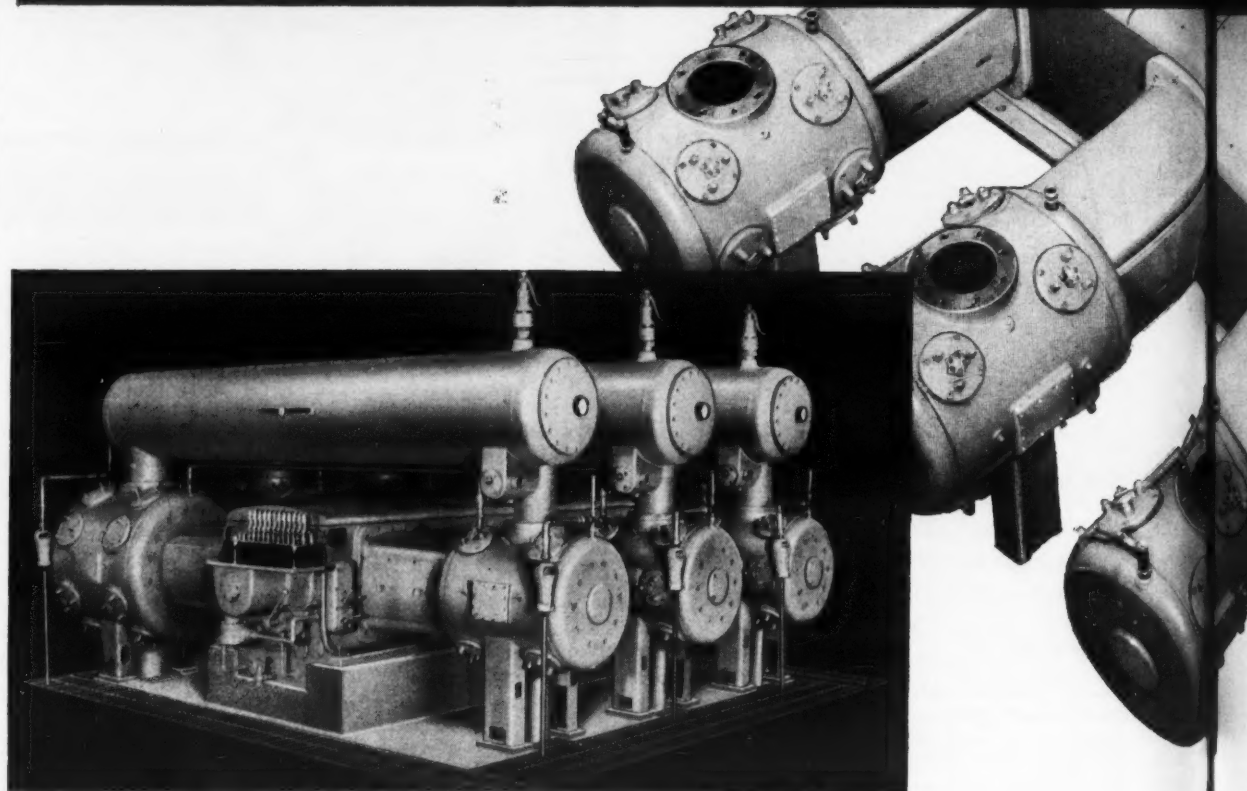
Air-to-air heat exchanger system, bearing construction, frame, stator, and rotor construction of redesigned line of tube-type motors are discussed in eight-page Bul 51-B8991 — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 1995 opposite last page.

BUILT FOR

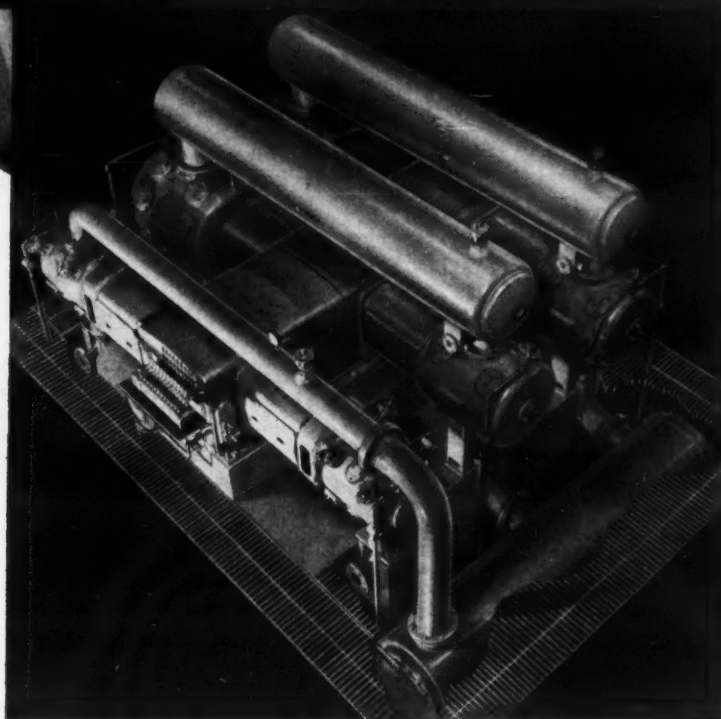
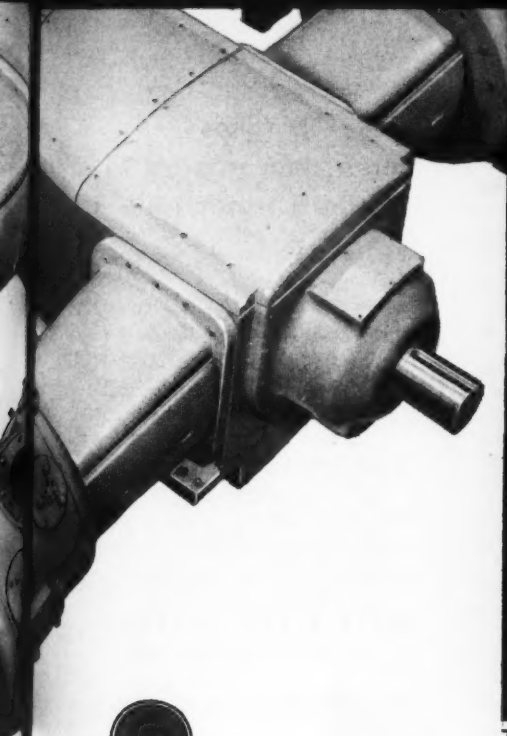
- for vacuum service or pressures to 15,000 p.s.i.g.
- in sizes to 5,000 H.P.
- for direct motor mounting, flexible coupling or gear drive

CLASS FE



The six-cylinder compressor unit in the background photo above represents but one of numerous cylinder-crankthrow arrangements obtainable with the balanced-opposed Class FE. The unit shown directly above is a two-stage arrangement, 1000 H.P. size, one of two recently purchased by a large engine manufacturer.

R HEAVY-DUTY E COMPRESSORS



The high pressure compressor above is a further example of the flexibility of the balanced-opposed design. Here, the six-cylinder arrangement is used in a 1,250 H.P. three-stage compressor for wind tunnel service.

Chicago Pneumatic

8 East 44th Street, New York 17, New York

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 1996 opposite last page

How conveyor cuts costs

Applications of pneumatic conveying systems designed for handling dry bulk materials are described and illustrated in 16-page Bul FK-26A that tells how handling costs are cut — Fuller Company, Subs. of General American Transportation Co., Catasauqua, Pa. Check 1997 opposite last page.

Blower, exhauster data

Operating data, specifications, and performance curves for 3-lobe rotary positive industrial blowers and exhausters are contained in six-page Bul 581 — Miehle-Dexter Div., Miehle-Goss-Dexter, Inc., 100 Fourth St., Racine, Wis.

Check 1998 opposite last page.

High-vacuum pumps

Containing many illustrations, diagrams, and charts, bulletin of 68 pages describes construction and operation of high-vacuum vapor pumps and also covers performance characteristics and specifications. Bul 6-1 — Rochester Div., Consolidated Electrodynamics Corp., Rochester 3, New York.

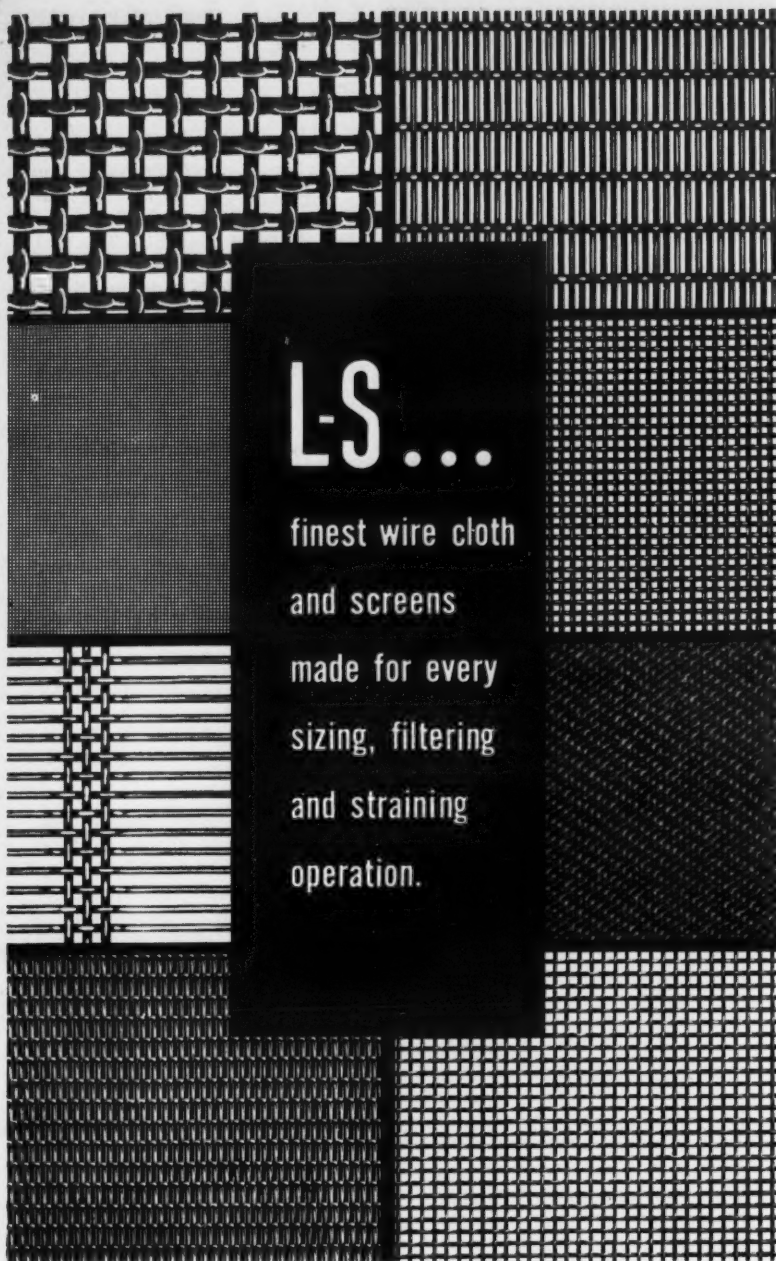
Check 1999 opposite last page.

Hydrides for pesticides

Report of four pages presents information concerning hydride reactions applicable to the manufacture of pesticides. For each reaction, report gives function of the hydride, solvent used, the equation, and review of principal application. "Hydrides For Pesticide Chemistry" — Metal Hydrides Inc., Congress St., Beverly, Massachusetts.

Check 2000 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



L-S...

finest wire cloth
and screens
made for every
sizing, filtering
and straining
operation.

Ludlow-Saylor Wire Cloth and Screens can be furnished in stainless, monel, bronze, brass, copper, oil-tempered, high-carbon, or any other metal that can be made into wire.

Whether your requirements can be met by one of the hundreds of weaves carried in stock—or one precision woven from special alloys exactly to your specifications—L-S Wire Cloth or Screens have proved far superior in resisting abrasion, corrosion, high pressure, vibration and heat. Specify L-S as a guarantee of better product uniformity and quality.

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SALES OFFICES: Birmingham, 1727-6th Ave. N.; Chicago, 5708 W. Diversey; Pittsburgh, Union Trust Bldg.; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St. WEST COAST SUBSIDIARY: Los Angeles, Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road.

Check 2001 opposite last page

NEW LITERATURE

On decorative laminates

What to do, and how to do it — all about decorative laminates using diallyl phthalate resin is described in comprehensive 13-sheet Technical Data 19 — Organic Chemicals Div., Food Machinery and Chemical Corp., 161 E. 42nd St., New York 17, N. Y.

Check 2002 opposite last page.

Describes fork truck

Illustrated bulletin of six pages contains operating characteristics and construction features of 2000-lb capacity gas-powered fork truck. "Clarklift 20" bul — Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Check 2003 opposite last page.

Polyethylene dry coloring

Advantages of dry-coloring technique for thermoplastic materials are discussed in four page bulletin which describes technique in detail. "Improved Dry-Coloring of Grev" — Polymer Chemicals Div., W. R. Grace & Co., 225 Allwood Rd., Clifton, N. J.

Check 2004 opposite last page.

For fighting fires

Fire fighting equipment and accessories available to industry including extinguishers, hoses, accessories, safety equipment, and other fire apparatus are listed in 22-page Cat 571 — American La-France Corporation, Dept. 571, Elmira, N.Y.

Check 2005 opposite last page.

Methyl chloride bulletin

Physical and chemical properties, specifications, toxicity, and applications of methyl chloride are discussed in 16-page chemical products bul — Chemical Products Dept., An-sul Chemical Co., Marinette, Wisconsin.

Check 2006 opposite last page.

X MARKS THE CRITICAL SPOTS!



It takes more than muscles to build a storage bin

Before the physical work of building a bin begins, we must know the problems involved at the Three Critical Points.

- X What is the loading problem?
- X What are the characteristics of the material to be stored ... and its "flowability"?
- X What is the volume and rate of discharge?

When planning your next storage bin, may we sit in on the very early stages of planning?

NEFF & FRY COMPANY

166 Elm St., Camden, Ohio



Check 2007 opposite last page
CHEMICAL PROCESSING



NO MAJOR REPAIRS IN 25 YEARS*

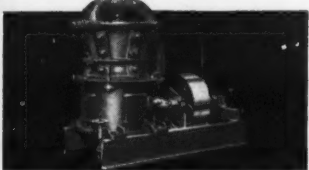
Sturtevant Construction Assures Long Mill Life at Top Loads

Sturtevant crushing and grinding machinery answers the long life top-load production problem for medium to small size plants. Many Sturtevants have been operating above rated capacities for more than 25 years, and *without a major repair*.

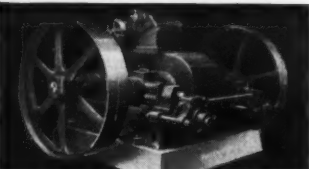
"Open-Door" design gives instant accessibility where needed — makes cleanouts, inspection and maintenance fast and easy. Machines may be set up in units to operate at equal quality and capacity.



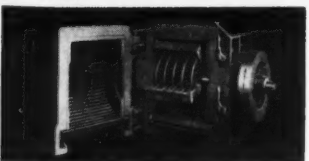
Jaw Crushers — Produce coarse (5 in. largest model) to fine (1/4 in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. Request Bulletin No. 062.



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to 1/4 to 1 1/4 in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. Request Bulletin No. 063.



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. Request Bulletin No. 065.



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30 1/2 in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12 1/2 x 24 in. Request Bulletin No. 084.

*Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.

STURTEVANT MILL COMPANY

119 Clayton St., Boston 22, Mass.

NEW LITERATURE

Plastics engineers note

The Society of Plastics Engineers is an international scientific and educational organization for those in the field of research, design, development, production, and utilization of plastics. This 16-page booklet tells "What SPE Can Do for You" — Society of Plastics Engineers, Inc., 34 E. Putnam Ave., Greenwich, Connecticut.

Check 2009 opposite last page.

Details small vibrator

Complete listing of dimensions and specifications of three standard models of electromagnetic vibrator which is designed to vibrate diminutive hoppers, tracks, and chutes of processing, assembling, and packaging machines. Model V-2 Data Sheet — Syntro Co., 445 Lexington Ave., Homer City, Pa.

Check 2010 opposite last page.

Describes belt conveyors

Besides covering components and accessories, bulletin contains photographs of actual installations which show typical applications of belt conveying systems. Blueprints detail two principal types of belt conveyors in "A-F Engineered Belt Conveying Systems" — The Alvey-Ferguson Co., 2721 Disney St., Cincinnati 9, Ohio.

Check 2011 opposite last page.

Insulation materials data

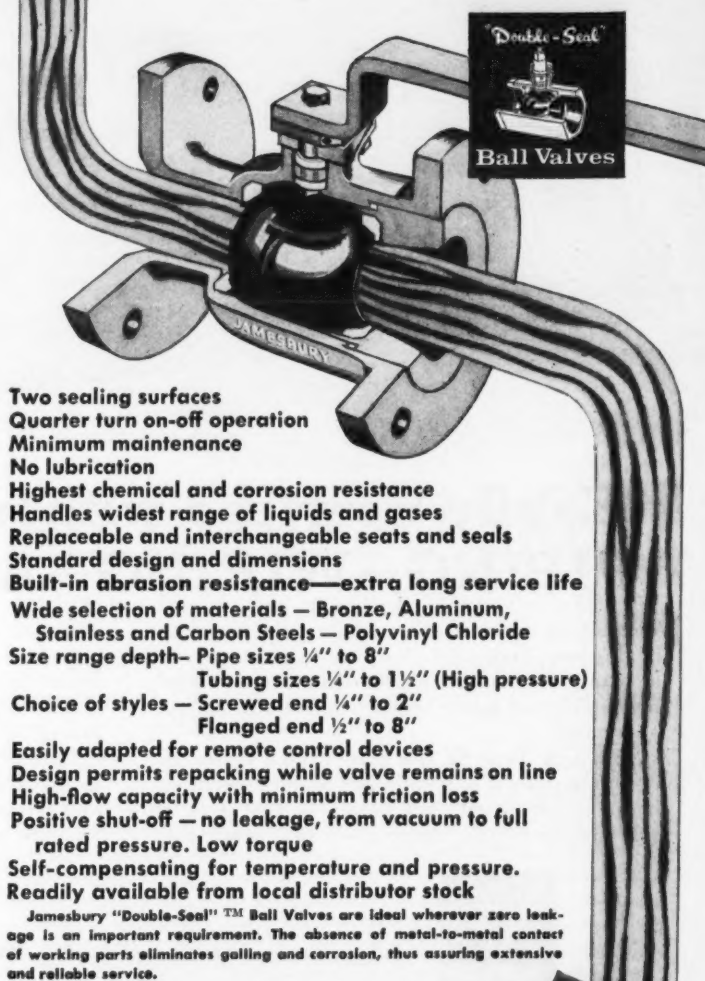
Thermal, mechanical, physical, and chemical characteristics of industrial insulations are presented in company's illustrated 20-page catalog. Selection chart indicating temperature ranges of industrial insulating materials is also provided. Cat J-424 — Industrial Insulation Division, Baldwin-Hill Company, 500 Breunig Avenue, Trenton 2, New Jersey.

Check 2012 opposite last page.

HOW TO KNOW WHOSE VALVE YOU NEED

for specifying on new equipment
replacing on present installations

Check these Jamesbury "Double-Seal" Ball Valve FEATURES



- Two sealing surfaces
- Quarter turn on-off operation
- Minimum maintenance
- No lubrication
- Highest chemical and corrosion resistance
- Handles widest range of liquids and gases
- Replaceable and interchangeable seats and seals
- Standard design and dimensions
- Built-in abrasion resistance—extra long service life
- Wide selection of materials — Bronze, Aluminum, Stainless and Carbon Steels — Polyvinyl Chloride
- Size range depth— Pipe sizes 1/4" to 8"
Tubing sizes 1/4" to 1 1/2" (High pressure)
- Choice of styles — Screwed end 1/4" to 2"
Flanged end 1/2" to 8"
- Easily adapted for remote control devices
- Design permits repacking while valve remains on line
- High-flow capacity with minimum friction loss
- Positive shut-off — no leakage, from vacuum to full rated pressure. Low torque
- Self-compensating for temperature and pressure.
- Readily available from local distributor stock

Jamesbury "Double-Seal"™ Ball Valves are ideal wherever zero leakage is an important requirement. The absence of metal-to-metal contact of working parts eliminates galling and corrosion, thus assuring extensive and reliable service.

Double-Check Jamesbury Features:

- Send for descriptive "At Your Service" booklet.
- Write for complete catalog under your company letterhead.
- Inquire about local Jamesbury Stocking Distributors.

JAMESBURY CORP., 65 NEW STREET, WORCESTER, MASS.

Check 2013 opposite last page

Check 2008 opposite last page



Easily Serviced without Disturbing PIPING—WIRING—ALIGNMENT

The complete drive unit, including the impeller, of this new Type SZ LaBour pump is removable as a unit for replacement or maintenance—leaving piping and motor undisturbed and in perfect alignment.

Although Type SZ is a non-priming pump, its design permits it to handle large quantities of air or gases mixed with the liquid, so that aerated solutions or volatile materials—within reasonable

limits—cause no trouble whatever. The fully open impeller and absence of sealing rings or other closely fitted pumping parts give this pump the ability to move dirty liquids without clogging or loss of efficiency.

LaBour dependability, long the recognized top in the industry, is built into this newest LaBour unit. Practically any requirement as to corrosion-resistant materials can be met.



Full particulars are yours for the asking. Why not write today?

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 2014 opposite last page



NEW LITERATURE

Rotary valve as feeder

Bulletin of four pages describes use of rotary valve as feeder, airlock, and explosion check. A five-point systems flow sheet shows the various installations, and exploded wash drawing provides complete construction details. Bul 24-C — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 2015 opposite last page.

Plastics versatility

Colorful brochure, "New Shapes In Plastics" describes products produced by vacuum, vacuum snap-back, drape, and stretch forming. An idea book — Delta Products, Div. of Air Accessories, Inc., 1400 Henderson, PO Box 1440, Fort Worth 1, Tex.

Check 2016 opposite last page.

Antioxidant uses

Bulletin of 12 pages describes use of antioxidant-treated packaging materials to extend shelf-life of fat-containing foods. Bul G-104 — Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., 260 Madison Ave., N. Y. 16, N. Y.

Check 2017 opposite last page.

Polyfluorocarbon resin

Bulletin of four pages describes polytetrafluoroethylene-base molded parts, which have improved mechanical and thermal properties. Bul BR-9 — The Polymer Corp. of Pa., Subs. of The Polymer Corp., 2140 Fairmont Ave., Reading, Pa.

Check 2018 opposite last page.

Data on epoxy resins

Illustrated eight-page brochure covers epoxies used in tooling, potting, coating and adhesion. "Epoxy Resins" — Marbette Corp., 37-31 30th St., Long Island City 1, N. Y.

Check 2019 opposite last page.

NEW LITERATURE

Material handling equipment constructed of steel, such as skids, box and skid units, bar carriers, pallets, drum racks, etc., are described and illustrated in 21-page Material Handling Equipment Bul — Berger Div., Republic Steel Corporation, 1038 Belden Ave., N.E., Canton 5, Ohio.

Check 2020 opposite last page.

Temperature transmitter that makes available temperature measurement within limits of -30 to 1200°F is subject of bulletin that discusses operation and points out features. Bul 98293 — Taylor Instrument Companies, Rochester 1, New York.

Check 1686 opposite last page.

"Pancake motors" — Bulletin of four pages presents full engineering data on enclosed "pancake motor" that reduces motor length up to 60% over conventional units, according to manufacturer. Cutaway drawing shows how short length is achieved through formed end coils and one-piece housing-bearing bracket. Bul 2100 — The Louis Allis Company, 427 East Stewart St., Milwaukee 1, Wisconsin.

Check 2021 opposite last page.

Conveyor for bulk materials is detailed in manufacturer's literature. Also available is "Idea Book" on material handling. Gifford-Wood Co., Hudson, N.Y.

Check 1938 opposite last page.

Homogenizers and mills are illustrated and briefly described in six-page condensed catalog that covers many sizes and types used for particle size reduction in various process industries. Condensed Cat 58 — Tri-Homo Corporation, 98 Highland Ave., Salem, Mass.

Check 2022 opposite last page.

Seals for mixers, pressure and vacuum applications, are of the quick-change rotary mechanical type. Description and other information can be found in Bul 111 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, New York.

Check 1816 opposite last page.

Airborne particle sampler for use with vacuum systems and aspirators is subject of bulletin which contains brief description and specifications. Bul A-100 — Palo Laboratory Supplies, Inc., 81 Reade St., New York 7, N.Y.

Check 2023 opposite last page.

"Hot" lab instruments — Manual describes and illustrates stereomicroscope and metallograph equipped with remote relay systems for "hot" cell work. Instruments are designed to obtain results equal to those used under normal "cold" lab conditions. Remote Control Equipment Manual — Industrial Instrument Sales, Bausch & Lomb Optical Co., 898 St. Paul St., Rochester 2, N.Y.

Check 2024 opposite last page.

Fume scrubbers, which may also be used as jet reactors to recover valuable solids, are described in six-page bulletin. Dimensions and sizing chart, along with graphs that indicate water consumption and capacity, are provided. Fume Scrubber Bul — Croll-Reynolds Co., Inc., 751 Central Ave., Westfield, New Jersey.

Check 2025 opposite last page.

Easy package selection for packager of dry, semi-liquid, or liquid products is made possible by two-page bulletin that categorizes 38 different types of cans. Diameters, minimum and maximum body heights, and types of slip covers are given in chart for round cans. Product Memo 112 — George D. Ellis & Sons, Inc., American & Luzerne Sts., Philadelphia 40, Pa.

Check 2026 opposite last page.

Zirconium and hafnium technical and application data are given in 16-page bulletin. Corrosion properties, mechanical characteristics, and other data are covered for various alloys of each metal. Zirconium and hafnium bul — Malory-Sharon Metals Corp., Niles, Ohio

Check 2027 opposite last page.

Remote controls—Operation and construction of line of remote controls is described in eight-page bulletin which includes typical applications and specifications. Remote Control Bul—Crown Controls Div., Trimount Instrument Co., 3119 West Lake St., Chicago 12, Ill.

Check 2028 opposite last page.

Tailrod compressors provide protection to processing and instrumentation equipment from effects of oil or oily vapors in compressed air or gas. Full floating piston prolongs life of carbon piston rings, eliminates danger of cylinder wall scoring. Bul 202 gives full details of Class 3-ATC units. Pennsylvania Pump and Compressor Co., Easton, Pa.

Check 1657 opposite last page.

**ONLY DORR-OLIVER MAKES
3 DIFFERENT PUMP TYPES
for complete chemical coverage**



NO FAVORS ASKED! OLIVITE PUMP in corrosive paper mill service

Handling 250 gpm of bleach liquor containing $2\frac{1}{2}$ to $3\frac{1}{2}\%$ calcium hypochlorite, often with abrasive undissolved crystals in the solution, is a tough test for a pump.

In over 2 years of continuous service, the Olivite pump above has asked no favors at the Lincoln, N. H., mill of the Franconia Paper Corporation. A high tensile strength rubber-base lining on the cast iron casing and cover and a covering of the same material on the impeller enable it to resist corrosion. Carbon ring seals supplant conventional packing — positively prevent liquid from working along the shaft sleeve. No metal seal parts are used.

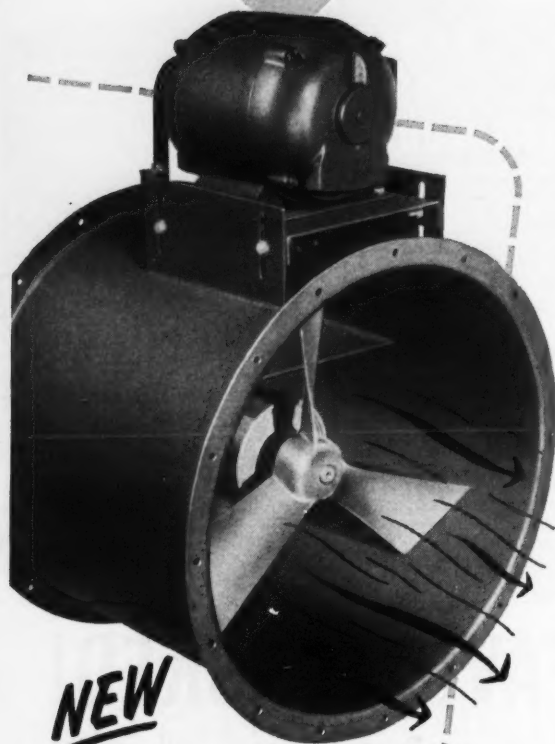
This is one of the specialized pump types made by Dorr-Oliver — the only major manufacturer offering a line that gives complete coverage of chemical industry requirements. Get the full story — write for Bulletin No. 5000.



OLIVITE—Reg. T. M.
Dorr-Oliver Incorporated

Check 2029 opposite last page

**expel
FUMES, HEAT AND DUST
at LOW COST**

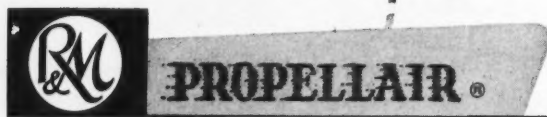


**NEW
PROPELLAIR®**

belt driven Tubeaxial Fans

Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-CP



DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO

*Certified
Ratings*



MAN COOLER



SKY-BLAST



VANEAXIAL



EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

Check 2030 opposite last page

NEW LITERATURE

Packaging equipment for filling valve- and open-mouth bags and drums is described and illustrated in ten data sheets contained in manufacturer's "Fact File Folder" — H. L. Stoker Company, 111 South College Ave., Claremont, California.

Check 2031 opposite last page.

Mixers of all types for fluid mixing applications are covered in manufacturer's condensed catalog. Bul 109 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.

Check 1816 opposite last page.

Anhydrous ammonia—Bulletin contains information on physical-chemical properties, specifications, and manufacturer's shipping and service facilities. Brief list of uses is included. Tech Bul 52—Industrial Products Dept., Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pa.

Check 2032 opposite last page.

Oil heaters, applicable to many industries where heating temperatures up to 500° F are required and operation at low pressures is desirable, are subject of four-page folder. Large cut-away view of heater illustrates internal construction, and features are fully described. Form RE-363 — Bros Incorporated, 1057 Tenth Ave., SE, Minneapolis 14, Minn.

Check 2033 opposite last page.

Tubing — Carbon, alloy, and stainless steel tubing in a broad range of grades, types, and sizes is described and specified in Bul TB-417 — Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

Check 1663 opposite last page.

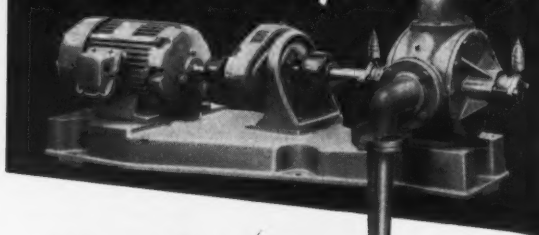
Automatic voltage regulators—Completely transistorized control circuit that detects changes in output voltage and supplies correction voltage to motor-driven power circuit is feature of automatic voltage regulator line described in 12-page Bul S358EMT—The Superior Electric Co., Dept. EMTB, Bristol, Conn.

Check 2034 opposite last page.

Bulk wire cloth provided in wide variety of specifications in any metal or alloy. Specifications most frequently used ready for immediate shipment. Catalog, stock list — The Cambridge Wire Cloth Company, Department F, Cambridge 10, Md.

Check 2111 opposite last page.

Got a suction problem?



LET BLACKMER

SOLVE IT

Because of their unique design, Blackmer self-priming rotaries have been successful for years in overcoming high suction lifts even with thick, sticky substances or with volatile liquids, where cavitation can be serious. Whatever your pumping problem, let Blackmer solve it. Write for Bulletin One.



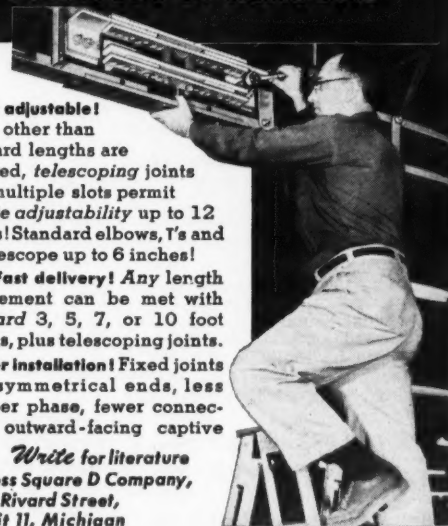
BLACKMER

"liquids materials handling"® equipment
BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.

See Yellow pages for your local sales representative

Check 2035 opposite last page

**SQUARE D's New ADJUSTABLE
ALUMINUM FEED-IN DUCT
FOR A LOT OF REASONS**



Really adjustable!

When other than standard lengths are required, telescoping joints with multiple slots permit infinite adjustability up to 12 inches! Standard elbows, T's and X's telescope up to 6 inches!

Fast delivery! Any length requirement can be met with standard 3, 5, 7, or 10 foot lengths, plus telescoping joints.

Faster installation! Fixed joints have symmetrical ends, less bars per phase, fewer connections, outward-facing captive bolts.

Write for literature
Address Square D Company,
6060 Rivard Street,
Detroit 11, Michigan



NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Check 2036 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Evaporator crystallizers hold solutions under controlled supersaturation conditions, assuring controlled crystal size and purity. Available in open and closed, vacuum and cooling types for continuous operation; batch crystallizers for intermittent operation. Bul CE-57 — Struthers Wells Corporation, Warren, Pa.

Check 1784 opposite last page.

Weigh-feeder equipment is detailed in 12-page illustrated bulletin which contains descriptive data and specifications on nine feeders, batch weighers, and bag weigh machines. "Weigh Feeders" — Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 2037 opposite last page.

Top entering mixers, propeller types, ¼ to 3 hp, are described in Bul 103 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.

Check 1816 opposite last page.

Dust collector bulletin of 12 pages (revised) describes and illustrates wet-type collector that separates dust from air by centrifugal and impingement action against wetted surfaces, without use of sprays, moving elements, and water eliminators. Bul 581 — Dust Suppression & Engineering Co., 120 South Broadway, PO Box 67, Lake Orion, Mich.

Check 2038 opposite last page.

Organic chlorine booklet — In addition to a detailed description of 11 organic chlorine compounds available in commercial quantities, 48-page booklet contains a general discussion of advantages and handling and storage procedures. "Organic Chlorine Compounds" Bul — Union Carbide Chemicals Co., Div. of Union Carbide Corp., 30 East 42nd St., New York 17, N.Y.

Check 2039 opposite last page.

Conveyor belt carrier — Tech data, specifications, and illustrations on manufacturer's line of conveyor-belt carriers are provided in Bul 355 — Stephens-Adamson Mfg. Company, Ridgeway Ave., Aurora, Ill.

Check 2040 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



NO COMPROMISE WITH QUALITY in Flexitallic Spiral-Wound Gaskets

There are shorter ways — quicker ways — to make gaskets, but there's only one Flexitallic way.

Each Flexitallic Spiral-Wound Gasket is made to meet a specific sealing requirement. The flange design and the bolt load determine the density of the gasket — compression response is directly related to service. And then, with the most exacting mechanical controls, each Flexitallic Gasket conforms to specification.

Result: the right gasket for the right flange, to make the proper seal.

In the severest service — thermal and physical shock, corrosion, vibration,

and unpredictable joint stresses — the Flexitallic Spiral-Wound construction compresses like a spring and then rebounds when the bolt load is relaxed.

For genuine Flexitallic Gaskets, look for Flexitallic Blue—the blue dye in the Canadian asbestos filler. It identifies the Spiral-Wound construction pioneered by Flexitallic in 1912.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N. J.

Flexitallic
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

Check 2041 opposite last page

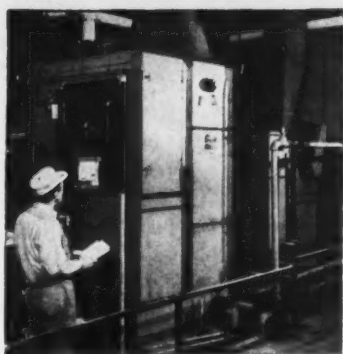
DRY and CLEAN AIR at the RIGHT TEMPERATURE

- to control your product quality
- to protect a critical operation
- to protect apparatus from moisture damage
- to DRY your material or product
- to control packing or storage conditions
- to assure precision in testing or research
- to increase air conditioning capacity

Air Condition by the NIAGARA Method
Using HYGROL Liquid Absorbent

This compact method, giving high capacity in small space, removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the air.

Most effective because... it removes moisture as a separate function from cooling or heating and so gives a precise result, and always. Niagara machines using liquid contact means of



drying air have given over 20 years of service. The apparatus is simple, parts are accessible, controls are trustworthy.

Most reliable because... the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions... no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

Most flexible because... you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Write for Bulletins 112 and 131 and complete information on your air conditioning problem.

NIAGARA BLOWER COMPANY

Dept. CP-10, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 2042 opposite last page

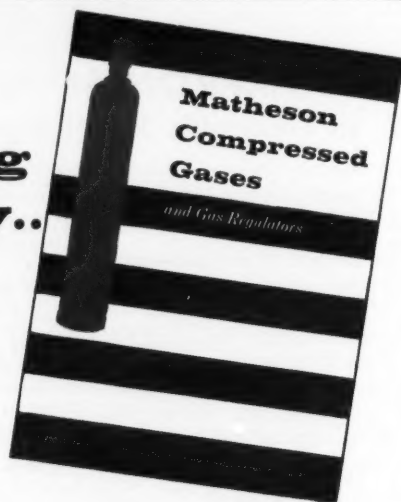
1958-59

Matheson Gas Catalog Now Ready..

New Radioactive Gases

New Accessories

New Data



Important Reference Manual for Laboratories and all users of Chemical Gases.

Prices and data on 80 Compressed Gases and Gas Mixtures, available in 5 cylinder sizes. Complete line of Precision Regulators, Controls, Flowmeters, Accessories, tailored to individual gas usage. Write for your free copy today.

The Matheson Company, Inc.

Compressed Gases and Regulators

East Rutherford, N. J.; Joliet, Ill.; Newark, Calif.

Check 2043 opposite last page

NEW LITERATURE

Flow meters—Catalog of 20 pages covers features, specifications, and applications of two basic models—one for flow and liquid level in open tanks; the other for liquid level in closed tanks under pressure or vacuum. Cat C22-1—Industrial Div., Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Pa.

Check 2044 opposite last page.

Sanitary conveyor elevators for bulk material can be completely disassembled in five minutes according to manufacturer's catalog. The Bucket Elevator Company, 360 S. Springfield Ave., Summit, New Jersey.

Check 1909 opposite last page.

Valves, check, relief, and shutoff, are described in six-page data folder that points out advantages, and lists dimensions and characteristics. Form S-2021R—Circle Seal Products Co., Inc., 2181 East Foothill Blvd., Pasadena, Calif.

Check 2045 opposite last page.

Insulating firebrick permits constructing thinner walls of equivalent insulating value, resulting in concrete and structural steel savings. It is said that higher unsupported walls can be built without deformation at furnace operating temperatures. Field installation simplified as ordinary wood working tools can be used for cutting and shaping. Bul R-2-H—Babcock & Wilcox Co., Refractories Division, 161 East 42nd St., New York 17, N.Y.

Check 1756 opposite last page.

"Hand Trucks—facts and factors" is illustrated 12-page bulletin which explains basic points to be considered in setting up an efficient material handling system. Selection of right hand truck for job, determining correct truck capacity for loads to be handled, and other factors are covered. Bul 5008-H—Automatic Transportation Co., Div. of The Yale & Towne Mfg. Company, 101 West 87th St., Chicago 20, Ill.

Check 2046 opposite last page.

Automatic transfer switch—How to select an automatic transfer switch and applications of this equipment are covered in 24-page booklet which briefly describes and illustrates seven typical illustrations of this equipment. Publication 596R1—Automatic Switch Company, Florham Park, N.J.

Check 2047 opposite last page.

Mixers, side entering—Bulletin features description and specifications of side entering mixers in 1 to 25 hp models. Bul 104—Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.

Check 1816 opposite last page.

Rota-cone dryer made in capacities from 1 to 500 cu ft is illustrated and described in 12-page Bul "C"—Paul O. Abbe, Inc., 402 Center Ave., Little Falls, N.J.

Check 2113 opposite last page.

Processing equipment for pulp, paper, and board mills is illustrated and briefly described in four-page condensed catalog. Information about service on engineering complete processing or production systems is included. Bul 58—The Bauer Bros. Co., 1728 Sheridan Ave., Springfield, Ohio.

Check 2048 opposite last page.

Gaskets, packings and cages made in Teflon featured by Chemical & Power Products, Inc., 9 Broadway, New York 4, N.Y. Three bulletins available: Packings and seal cages; gaskets; Teflon stock and special molded and machined parts. Please specify.

Check 1761 opposite last page.

Valves, gas and forged steel, are described in 92-page catalog that features visual index at beginning that shows every valve cataloged, arranged in groups according to type. Data includes ASA dimensions, ASA pressure-temperature ratings, and ASTM basic materials specifications. All standard valves made by manufacturer are covered in Cat 14—Edward Valves, Inc., subs. of Rockwell Manufacturing Co., East Chicago, Ind.

Check 2049 opposite last page.

Water-cooling towers—packaged for use with commercial and industrial air-conditioning systems are detailed in four-page circular that includes easy-to-read charts giving specifications, dimensions, and performance ratings. Circular SP-1—Mason Products, Inc., Section 3, 317 Main St., West Concord, Mass.

Check 2050 opposite last page.

Laboratory balances, using shadow reading for fast, positive indication, are described in four-page, two-color Bul 3270—The Exact Weight Scale Co., Columbus, Ohio

Check 2051 opposite last page.

NEW LITERATURE

Intermediate chemicals, 18 of them, some commercial and others experimental, are described in 16-page booklet which gives physical and chemical properties and lists suggested applications for each. "Chemicals for the Creative Chemist"—Commercial Development Dept., Naugatuck Chemical div., United States Rubber Co., Naugatuck, Conn.

Check 2052 opposite last page.

Coder-Printer — Features of high-speed fully automatic device designed to place simultaneous imprints on top and bottom of up to 400 containers per minute are described in catalog sheet. Coder-Printer Cat Sheet — Cozzone Marking Co., 18 Nuttman St., Newark 1, N.J.

Check 2053 opposite last page.

Calibrating machine which facilitates calibration of load cells is subject of four-page bulletin that describes application, operation, and specifications. Bul 158—Morehouse Machine Company, 1742 Sixth Ave., York, Pa.

Check 2054 opposite last page.

Feeders for sulfuric acid and other corrosives, made of polyvinyl chloride, are discussed in four-page brochure. Bul 584 — The Clarkson Company, 564 Market St., San Francisco 4, Calif.

Check 2055 opposite last page.

Waste disposal—Details on low-cost system for disposing of cyanide and chromium wastes are presented in six-page Bul 90-242-13—Fischer & Porter Co., 543 Jacksonville Rd., Hatboro, Pa.

Check 2056 opposite last page.

Thermistor circuits, 15 of them, are described in 16-page catalog which also gives specifications for nearly 400 different thermistors. Cat EMC-2 — Fenwal Electronics, Inc., Mellen St., Framingham, Mass.

Check 2057 opposite last page.

Handy truck-attachment check list shows special attachments, accessories, and options available with each unit of manufacturer's industrial truck line. Specifications of line of lift trucks from 1000- to 20,000-lb capacity, as well as other industrial trucks, are contained in guide. Truck Attachments Guide — Hyster Company, 1003 Myers St., Danville, Illinois.

Check 2058 opposite last page.

Stainless steel pumps for corrosives are described in eight-page bulletin. Pump capacity curves and four different seal arrangements are given. Bul 258-I — Tri-Clover Div., Ladish Co., Kenosha, Wisc.

Check 2059 opposite last page.

Strontium salts—Products list describes strontium hydrate (hydroxide), strontium peroxide, strontium chloride, strontium nitrate, strontium oxalate, and strontium carbonate. Strontium Salts Products List—Hummel Chemical Company, Inc., 90 West St., New York 6, New York.

Check 2060 opposite last page.

Rotary valve airlock provides continuous discharge or feed of dry material; may be operated under slight pressure or vacuum. Bul 54A — Mikro Pulverizing Machinery Division, Metals Disintegrating Company, Inc., 60 Chat-ham Rd., Summit, N.J.

Check 1916 opposite last page.

Sixty-six fatty acids and derivatives, listed in loose leaf folder, are non-commercial products difficult to locate, which—so far as is known—are available from no other source than that shown. Supplementary sheets will be added to this listing. To obtain "Fatty Acids and Fatty Acid Derivatives", remit \$1.00 direct to Fatty Acid Producers' Council, division of Association of American Soap & Glycerine Producers, Inc., 295 Madison Ave., New York 17, N.Y.

Accurate flow measurement, single or bi-directional, is claimed for instrument described in four-page bulletin that covers advantages, operating principle, and specifications. Flow Transducer Bul—Ramapo Instrument Co., Inc., 8 First St., Bloomingdale, N.J.

Check 2061 opposite last page.

Lists organic chemicals — Forty-four different specialty organics are listed in manufacturer's 12-page 1958 domestic catalog and price list — Arapahoe Chemicals, Inc., 2800 Pearl St., Boulder, Colo.

Check 2062 opposite last page.

Portable mixers, 1/8 to 3 hp, for fluid mixing applications are described in bulletin that lists specifications. Bul 108 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.

Check 1816 opposite last page.

Allflex

STAINLESS STEEL "MNH" FLEXIBLE CONNECTORS

A NEW stock answer to pipeline problems caused by rigid connections.

- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With ALLFLEX Stainless Steel Connectors you get:

- CORROSION RESISTANCE . . . plus
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Also available in Monel, Bronze and Steel.

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IN THESE STOCK LENGTHS
12" 18" 24" 30"
36" 48" 60"

also available in all standard sizes, in any required length, with any standard or special fitting or flange. Full engineering information on ALLFLEX Stainless Steel Hose can be found in: Chemical Engineering Catalog, pages 153 to 156; Refinery Catalog, pages 169 to 172 (Allied A, B, C, D)

ALLFLEX Standard Stainless Steel Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

ALLIED METAL HOSE COMPANY
3784 Ninth Street, Long Island City 1, N. Y. • Stillwell 4-5173

Check 2063 opposite last page

NEW AMWELL Tank Mixer

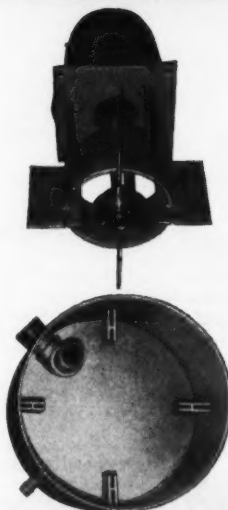
WITH HIGH-SHEAR IMPELLER

More Efficient for Mixing Dry Materials with Liquid

Uses high-shear impeller with controlled recirculating mixing to disperse a wide variety of highly cohesive solids in liquids. Positive flow impeller and high speeds (3500 RPM) develop the high shear without the disadvantage of close clearances. Can be furnished in single or multiple stages to accommodate a wide range of solid and liquid rates, for continuous or batch mixing.

Impeller rotates within a baffled draft tube. Feed materials are drawn into impeller suction eye and instantly dispersed. Baffles completely eliminate swirl and insure thorough tank turnover. Unique design and high velocity action insure passage of the raw feed through the high shear zone, promote thorough recirculation and prevent sedimentation. Ruggedly built. Standard materials are carbon steel, bronze and stainless steel. Special alloys can be provided.

Write for engineering and performance data.



AMERICAN WELL WORKS



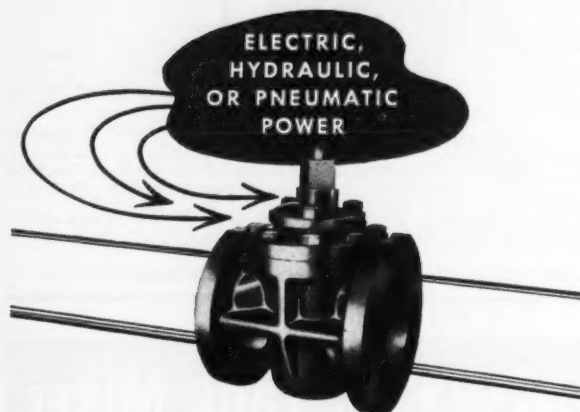
MIXING, PUMPING, WATER & WASTE TREATMENT EQUIPMENT
122 NORTH BROADWAY, AURORA, ILLINOIS
Sales Offices: Chicago, New York, and other principal cities

OUR
90th
Anniversary

Check 2064 opposite last page

ROCKWELL- Nordstrom VALVES

CUT POWER OPERATION COSTS



1. Rockwell-Nordstrom valves cut power operation costs two ways:

Rockwell-Nordstrom valves require simpler, less costly operators because the lubricated plug is moved through only 90° for closure.

2. The pressurized lubricant that assures leak-proof, positive shut-off also prevents metal-to-metal friction... the chief cause of valve wear. This means longer valve life and greatly reduced maintenance and down time costs.

Rockwell-Nordstrom valves are available in "package" units with a variety of electric, pneumatic or hydraulic actuators to meet your automatic valve needs. Rockwell-Nordstrom, the world's most complete line of lubricated plug valves, cost no more to buy—often less—than ordinary valves. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

For details, just circle 2065 on the reply slip in this magazine.

ROCKWELL-Nordstrom VALVES

it's **ROCKWELL** 
MANUFACTURING COMPANY

Check 2065 opposite last page

NEW LITERATURE

Mixers, top or bottom entering — Turbine, paddle, and propeller types, 1 to 500 hp, are covered in Bul 102 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.

Check 1816 opposite last page.

Atomized aluminum alloys, their physical and chemical properties, are described in manufacturer's data sheet. Aluminum Alloys Data Sheet—Hummel Chemical Co., Inc., 90 West St., New York 6, New York.

Check 2066 opposite last page.

Diepoxides, two new ones, are treated in bulletins which contain technical information, including properties and suggested uses. Dicyclopentadiene dioxide is described in Bul 95 and limonene dioxide is described in Bul 96 — Becco Chemical Division, Food Machinery & Chemical Corporation, Station B, Buffalo 7, N. Y.

Check 2067 opposite last page.

Enrico Fermi nuclear power plant's capability to contain an accidental explosion is discussed in 31-page report of a government-sponsored atomic energy study. To obtain Report PB 131583, "Containment Study of the Enrico Fast Breeder Reactor Plant", remit \$1.00 direct to Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

Ion exchange equipment and techniques are described and discussed in company bulletin that will aid in evaluation of possibilities for solution to specialized purification problems. Bul 200 — Industrial Filter & Pump Mfg. Co., 5908 Ogden Ave., Chicago 50, Ill.

Check 1820 opposite last page.

Lightweight roller conveyors designed for general package handling are subject of two-page bulletin that provides complete specifications. Bul 735 — Samuel Olson Mfg. Co., Inc., 2418 Bloomingdale Ave., Chicago 49, Illinois.

Check 2068 opposite last page.

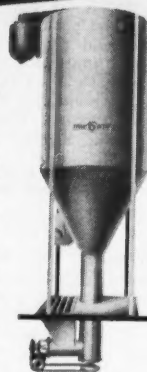
Designed to condense vapors in a closed system, unit has seven or eight degrees sub cooling. Bulletin of four pages explains functions, and provides capacity curves for eight sizes, plus table of dimensions and weights. Bul 139R — Niagara Blower Company, 405 Lexington Ave., New York 17, New York.

Check 2069 opposite last page.

CUT MIXING COSTS!

SPROUT-WALDRON VERTICAL MIXERS

These mixers handle an amazingly wide variety of materials with less horsepower, less floor space, less maintenance, less first cost than any other type of mixers. Sizes up to 1500 cu. ft. can operate on as little as 30 h.p. They're completely self-cleaning. Ideal for use as agitated storage reservoirs.



Write for
Bulletin 192

Sprout-Waldron also offers a complete line of horizontal mixers. Write for details.

SPROUT-WALDRON

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MUNCY, PENNSYLVANIA

EQUIPMENT FOR SIZE REDUCTION—MIXING & BLENDING — BULK MATERIALS HANDLING — PELLETING & CUBING — PRODUCT CLASSIFICATION



Check 2070 opposite last page

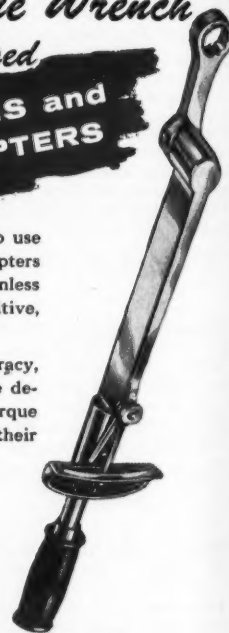
Only ONE Torque Wrench can be accurately used with...

EXTENSIONS and ADAPTERS

It is mechanically impossible to use any Torque Wrench with adapters or extensions (with accuracy) unless that Torque Wrench has a positive, built-in, fixed load position.

This essential factor of accuracy, misunderstood or ignored in the design and manufacture of some torque tools, can completely defeat their purpose.

PATENTED
PIVOTED HANDLE
FIXES LOAD POSITION



Write for Torque Manual

with formulae tables and explanations for correct use of adapters and extensions.



PA **STURTEVANT CO**
ADDISON [QUALITY] ILLINOIS

Check 2071 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Null-balance-vector pneumatic instruments are covered in four-page bulletin which presents complete engineering data and features. Bul 58-5 — Republic Flow Meters Co., Subs. of Rockwell Mfg. Company, 2240 Diversey Pkwy., Chicago 47, Ill.

Check 2072 opposite last page.

Steam trap design features are highlighted in four-page condensed catalog that includes physical data, capacity, and price list tables. Cat 200 — Velan Steam Specialties, Inc., 37 South River St., Plattsburg, N.Y.

Check 2073 opposite last page.

Heat-resistant phenolic molding powders are described in illustrated brochure. Characteristics, properties, and applications are covered in Bul CDC-355—Chemical Materials Dept., General Electric Company, One Plastics Ave., Pittsfield, Mass.

Check 2074 opposite last page.

Dry feeders which provide accurate feeding of dry chemical reagents for water filtration, sewage disposal, and other industrial processes are detailed in eight-page illustrated bulletin which gives specifications for five standard models. Dry Feeder Cat — Syntrol Company, 110 Lexington Ave., Homer City, Pa.

Check 2075 opposite last page.

Cyanide, chrome waste treatment engineering data is contained in four-page data sheet which contains schematic flow diagrams and explains methods and equipment used to meter necessary chemicals automatically. Data Sheet D-58-1 — Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Check 2076 opposite last page.

Gravimetric feeders, simplex or duplex, for liquids or solids are subject of eight-page bulletin. Dimensional drawings and tables, photographs, schematic drawings, and performance charts are provided in Bul 32-R2 — Omega Machine Company, Div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.

Check 2077 opposite last page.

Mixer requirements can be figured on this confidential data sheet supplied by manufacturer. Bul 107 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, New York.

Check 1816 opposite last page.

APPLETON V-51 SERIES CONVERTIBLE VAPORTIGHT FIXTURES

Require only seconds
to relamp or convert!

One trip up the ladder, a few quick twists of the wrist, and relamping or wattage conversion is done! V-51 reflectors with integral neoprene ring adapt perfectly to the grooved unilet... permit instantaneous substitution of reflectors.



Maintenance man takes spare assembly to lamp requiring replacement or wattage change... removes lamp assembly... screws fresh unit in place and the job is done! Higher wattages of 150/200 are interchangeable with 100 watt unit and can be used in same unilet body. (Die-cast aluminum guard turns counter clockwise to act as a tool for easy removal in relamping).

An upward thrust and slight quarter twist engages neoprene ring with the groove in the unilet and snaps the reflector in position. Entire operation of removing lamp, inserting new unilet, and positioning of reflector requires no special tools... no set screws... no small parts to juggle. Absolute simplicity!

Mountable from Unilet
Takes either 100 W or
150-200 W adapters.
Ceiling, pendant, or
bracket types available
in a variety of hub sizes.

Reflector
Steel, with green porcelain enamel exterior, sized for 100 W, 150 W, or 200 W lamps. Snaps easily into position.

Unit Assembly...
Adapter, Globe, and Guard
100 W and 150-200 W size globe adapter with shock absorbing socket. Die cast aluminum guard has two sealed stainless steel ball plungers which snap securely into cavities in adapter. Vaportight globe in 100 W or 150-200 W sizes in clear glass or various colors.



U. S. Pat. 2,749,433
2,749,435 2,715,214
Canada Pat. 531,655
511,696

For economical service and maintenance, it's hard to find anything more practical than Appleton's V-51 Series exclusive unit assembly (adapter, receptacle, globe, and guard). Shock absorbing socket cuts lamp replacement costs. Try the Appleton V-51 Series standard or shallow dome, deep bowl, or angle type reflectors and 100 W and 150/200 W vaportight unit assemblies in your plant today. Available in a variety of hub sizes in pendant, ceiling, or bracket type fixtures for every kind of installation.

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APPLETON
*... the Standard for
Better Wiring*

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Also Manufacturers of:



"ST" Series Connectors



Outlet Boxes



Explosion-Proof Fixtures



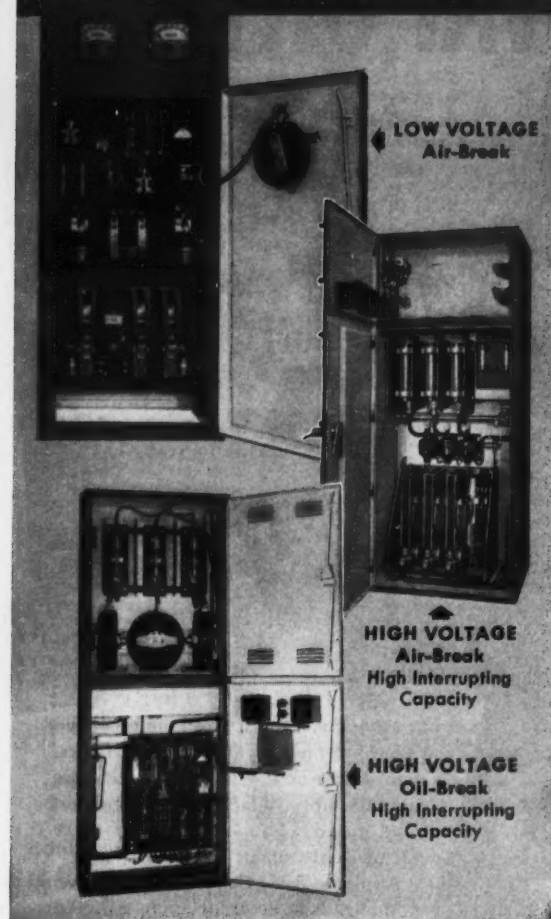
Malleable Iron Unilets & Covers



Automatic Reelies

Check 2078 opposite last page

it's EC&M FOR A COMPLETE LINE OF SYNCHRONOUS MOTOR STARTERS!



FOR ALL LOW VOLTAGES AND FOR 2200-4800 VOLT POWER SYSTEMS!

• Fully automatic pushbutton operation. Motor pulls into step without delay because field is applied under best conditions for synchronization. Automatic field removal and re-synchronization. Internal wiring is complete for easier installation.

Write for Bulletins 8200 and 8820



THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28, OHIO

8939

Check 2079 opposite last page

NEW LITERATURE

High pressure hose and tube assemblies are covered in 32-page bulletin which claims new approach in helping purchasing agents and design engineers meet specifications for higher pressure requirements. Nine major sections of bulletin are devoted to couplings suited to all types of hydraulic applications. Tech Bul 200 — Eastman Manufacturing Co., Manitowoc, Wis.

Check 2080 opposite last page.

Mixers for laboratory and small-batch production operations are subject of company Bul 112 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, New York.

Check 1816 opposite last page.

1957 ASTM Proceedings—Recording the technical accomplishments of the year, 1430-page volume includes reports and papers, together with discussion, offered to the Society during the year and accepted for the "Proceedings". In addition, the volume contains much discussion not previously published.

The 66 reports of technical committees and the 52 technical papers provide useful information and discussion on wide variety of subjects pertaining to research and testing materials. To obtain the 1957 ASTM "Proceedings", Volume 57, remit \$12.00 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pennsylvania.

Safety precautions in study of chemical reactions at high pressure are discussed in bulletin of four pages. Areas covered include laboratory facilities, equipment, instrumentation, and installation, operation, maintenance, and inspection, and personnel. Tech Bul 100 — Autoclave Engineers, 2930 West 22nd St., Erie, Pa.

Check 2081 opposite last page.

Pipe unions made from 80,000-lb. tensile strength steel feature uniform walls, ball-to-angle seats for "perfect seal," wall thicknesses for 6,000 lb. service, 18,000 lb. test, and barrels engineered for fast wrenching. Cat 58 — Catawissa Valve & Fittings Co., Catawissa, Pennsylvania.

Check 1677 opposite last page.

Vertical pressure filter design, construction, and operation are detailed in 12-page Bul EF/2 — Enzinger Div., The Duriron Co., Inc., Angola, N.Y.

Check 2082 opposite last page.

"...yet we have IMPROVED it"

The Marsh Stainless Steel Needle Valve could have gone right on being the finest in its field...yet we have improved it



MARSH Needle Valve in 416

stainless steel throughout
Now with "Teflon" Packing

MARSH INSTRUMENT CO. Sales Affiliate of Jas. P. Marsh Corp., Dept. Z, Skokie, Ill.
Marsh Instrument and Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alberta
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

Check 2083 opposite last page

get accurate level readings of hot or cold liquids



Reflex Type,
Internal Tube
Model

... with Jerguson Heated and Cooled Gages

Jerguson Heated and Cooled Gages are the answer if you have the problem of getting accurate level readings of liquids that boil or surge...or liquids that are heavy and don't flow at normal temperature.

These gages are specially designed and built to carry a cooling circulating medium to control boiling tendencies...or a heating circulating medium to speed the flow...so you get accurate readings. Available in external or internal tube models, reflex or transparent types, in a large number of sizes and pressure groups.

Jerguson's high standards of design are followed throughout; and materials are selected to exceed or conform to A.I.S.I., A.S.T.M. and/or A.P.I.-A.S.M.E. requirements.

Send for detailed Data Unit and full information.

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for the Observation
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Offices in Major Cities. In Canada: Peacock Bros. Ltd.
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See Booth 631 — Power Show

Check 2084 opposite last page

CHEMICAL PROCESSING

DEPENDABLE 100% AUTOMATIC REMOTE READING Tank Contents Gauges

- RELIABLE
- NO POWER REQUIRED
- UNDERWRITERS' APPROVED

Liquidometers use a temperature compensated balanced hydraulic system. Indications unaffected by changes in specific gravity. All models feature large easy-to-read dials. UL approved switches available.

Write for complete details to
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Since 1920  of proven quality



THE LIQUIDOMETER CORP.
LONG ISLAND CITY 1, NEW YORK

Check 2085 opposite last page

effective tank cleaning

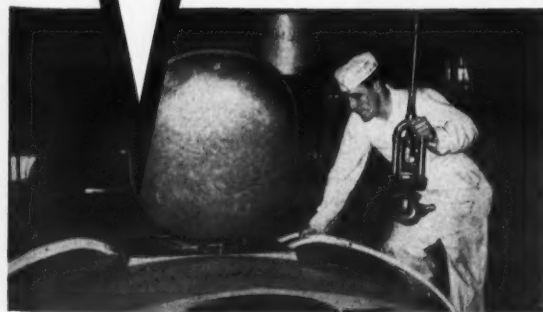


Company effectively cleans 30-40 tank trucks a night with 3 Sellers Rotor Jets.

Here's the newest, fastest, world's most effective mechanical tank cleaning equipment for tanks, tank trucks, tank cars. Completely cleans them in far less time... regardless of size or shape. Rotor Jet delivers solid jet stream of liquid (hot or cold, with or without chemicals) with high impact. Designed cleaning pattern with controlled speed attacks every angle... cleans every inch. Complete information is contained in Bulletin 432. Write for your free copy today.

Since 1848

SELLERS Rotor Corporation
1600 U Hamilton Street, Philadelphia 30, Pa.



Check 2092 opposite last page

NEW LITERATURE

Ion exchange resins in treating sugar-bearing liquids are discussed in 14-page booklet which devotes broad coverage to the demineralization of extracts of beets and cane, including discussion of economics of using ion exchange. Bul 28—Chemical Process Company, 1901 Spring St., Redwood City, Calif.

Check 2087 opposite last page.

Miniature thermocouples in four basic designs are described and illustrated in 28-page catalog that includes temperature conversion tables. Miniature Thermocouple Cat — Thermo Electric Co., Inc., Saddle Brook, N.J.

Check 2088 opposite last page.

High-vacuum impregnating, both advanced European and American, drying, degassing, and filling techniques of special interest to manufacturers and users of electrical distribution equipment, electronic components, and thermosetting organic compounds such as epoxy resins are described in 28-page bulletin. Graphs and technical information detail characteristics resulting from high vacuum processing. Bul I-2 — NRC Equipment Corporation, Subs. of National Research Corporation, 160 Charlemont St., Newton, Massachusetts.

Check 2089 opposite last page.

Continuous feeding of powders of all flow characteristics claimed in unit with feeding rate of 25 grams minimum to 100 lbs. per minute, or tons per hour. Also handles hard, granular materials, spherical pellets, wet, oily or pasty materials. Bul 54B — Mikro Pulverizing Machinery Division, Metals Disintegrating Company, Inc., 60 Chatham Rd., Summit, N.J.

Check 1916 opposite last page.

Wide-die pellet mill with standard feeder-conditioner and extra long feeder-conditioner for use with bulky feeds and molasses mixtures is described and illustrated in four-page Bul 201 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 2090 opposite last page.

Corrosion resistant stainless steel featured in full line of pumps specifically designed to handle corrosive and abrasive fluids in the one to 80 gpm range. No external lubrication necessary. Catalog, performance curves — Bart Manufacturing Corp., 229 Main St., Belleville 9, N.J.

Check 1533 opposite last page.

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your headquarters
for **STANDARD**
or **SPECIAL**
HEAT
TRANSFER
UNITS




STANDARD SK Type "BD" Heat Exchanger, two-pass design for service in petroleum, power, chemical processing, and other industries. Also made in single-pass design.

SPECIAL SK Radiant Air Cooler, one of two large coolers designed and manufactured for a special project. SK welcomes inquiries for special units—willingly offers experienced assistance.

Get Full Details. Write for Bulletin HT-1.



 **Schutte and Koerting**
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MANUFACTURING ENGINEERS
2215 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus Ask for Condensed Bulletin J-1	Rotameters & Flow Indicators. Ask for Condensed Bulletin 18 RA	Valves. Ask for Condensed Bulletin 18 V-1	Heat Transfer Apparatus. Ask for Condensed Bulletin HT-1	Gear Pumps. Ask for Bulletin 17 A
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Check 2091 opposite last page

PROTECT YOUR HANDS!



SILA-HAND . . . THE NEW PROTECTIVE INDUSTRIAL HAND CREAM, REALLY WORKS!

Your hands are constantly exposed to the injurious, harsh and damaging effects of solvents, acids and alkalies — protect them with **SILA-HAND**.

The high percentage of silicone in **SILA-HAND** forms a protective coating against the action of these chemicals. **SILA-HAND** eliminates the damaging effects to your hands and helps keep dirt and grime from penetrating the pores of your skin.

SILA-HAND also contains lanolin to help replace the natural body oils that have been dehydrated from the hands.

Don't put up with sore, rough and dried out hands another day . . . order a supply of **SILA-HAND** today! Use the coupon below for fast service.

WARCO LABORATORIES

13609 So. Normandie Ave., Gardena, Calif.

Please send _____ jars of **SILA-HAND** at \$1.75 per jar plus tax and postage to:

NAME _____

COMPANY _____

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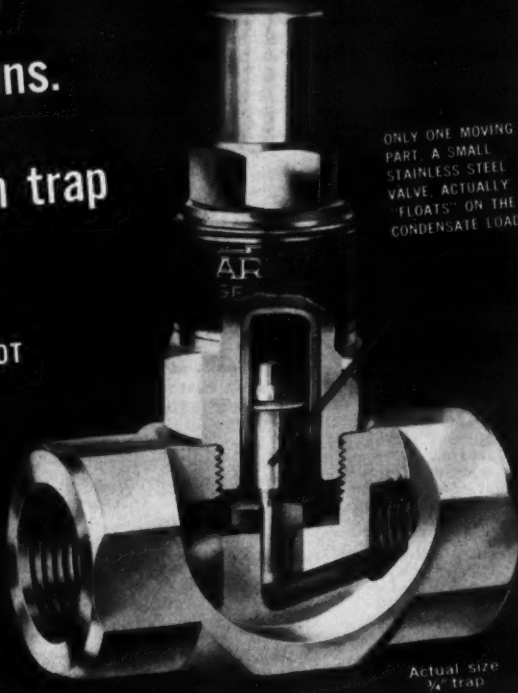
Check 2086 opposite last page

YARWAY IMPULSE* is the only steam trap that continually samples fluid in the line to maintain condensate discharge close to steam temperature, eliminating condensate as soon as it forms.

Condensate seals the small control orifice against steam leakage under all normal operating conditions.

Here's why your best steam trap buy is Yarway Impulse—

1. GETS EQUIPMENT HOT FAST—AND KEEPS IT HOT
2. ONLY ONE MOVING PART
3. LOW MAINTENANCE
4. SMALL SIZE—LIGHT WEIGHT
5. GOOD FOR ALL PRESSURES
6. NON-FREEZING
7. COMPLETE LINE FOR EVERY REQUIREMENT



* A COMPLETE LINE OF STEAM TRAPS, ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE

YARWAY

impulse®

Manufactured by YARNALL-WARING CO., 125 Mermaid Ave., Philadelphia, Pa.
Stocked and sold by 125 Industrial Distributors
Write for free bulletin "The Why and How of Steam Trapping"

Check 2093 opposite last page

Build Now

From page 31

ness. Basic construction costs can be reduced — partially through modest price adjustments in many materials, but principally through the ready availability of preferred equipment, lower "shopping" and inspection costs, and the inherent economies of reliable delivery schedules.

As engineers and constructors, we are particularly conscious of the current availability of the best technical and drafting talents. New projects can be staffed at this time with the most capable men, and executed in the shortest time commensurate with sound engineering practices.

The financing of new construction has too many facets to be discussed in brief. However, money is available today on reasonable terms to any firm making a sound presentation of its project. The urgency with which many communities are seeking new industry has, in some instances, been of active value in obtaining financing and tax concessions.

Chemical processing is a growth industry of tremendous potential. The current lull in the construction industries offers alert management of chemical firms a very real opportunity to improve their competitive position in tomorrow's market through well-planned investment in new construction. The dividends will be generous.



"Barnes, you're a good chemist but a lousy architect."

'More plant per dollar can be obtained now'

Carl B. Whyte*, President, Procon Incorporated — This year is the best time to build needed chemical plant expansion. More plant per dollar can be obtained now than in the past two years or, according to all indications, than in 1959 and 1960.

Currently, costs are running from 5% to 10% lower than those of a year ago, the exact



Carl B. Whyte

amount depending upon type of plant and location.

All economic signs point toward steady upward pressure on construction costs starting in late 1959, and perhaps sooner. Federal government fiscal policies seem headed in directions that will increase costs of construction materials and labor. While these policies also tend to reduce interest rates of construction money, it is questionable whether sufficient low-cost financing will be available to accommodate a flood of construction projects that now are deferred temporarily.

Of course any chemical plant construction must be based upon detailed studies of potential markets for products of the proposed plant. Assuming that the studies show the products can be sold profitably, the following factors encourage plant construction now:

- 1) The lowered industrial

*Mr. Whyte is also president of National Constructors Association.



ALLEN-BRADLEY

Cutting Costs in the Chemical Industry



Photo Courtesy of Texas Butadiene & Chemical Co.

This Motor Starter is built to be forgotten!

Even routine inspection is kept to an absolute minimum with Allen-Bradley motor starters . . . an especially important saving when your installation requires bolted covers, as used with watertight and explosion-proof enclosures.

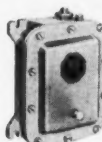
It's the simple contact mechanism—with only ONE moving part—that enables Allen-Bradley solenoid starters to operate over long periods without attention. With no bearings to corrode or stick . . . no flexible jumpers to break . . . you are assured *millions* of trouble free operations. In addition, there are double break, silver alloy contacts that never need servicing of any kind. And permanently accurate thermal overload relays protect motors against burn-out, irrespective of time or atmospheric conditions.

Specify Allen-Bradley quality controls for *all* your installations . . . and you'll save on maintenance.

Bulletin 709 Size 1 Solenoid Starter in NEMA Type 4 watertight enclosure



NEMA 9
For Hazardous
Dust



NEMA 7
For Hazardous
Gas Locations



NEMA 8
For Corrosive
Hazardous Gas



NEMA 11
Corrosion-
proof

Allen-Bradley Bulletin 709 across-the-line solenoid starters are made in eight sizes with maximum ratings to 300 hp, 220 volts; 600 hp, 440-550 volts.

ALLEN-BRADLEY CO.
MOTOR CONTROL
QUALITY



Allen-Bradley Co., 104 W. Greenfield Ave.
Milwaukee 4, Wis.

In Canada: Allen-Bradley Canada Ltd.
Galt, Ont.

Check 2094 opposite last page

METER YOUR LIQUIDS and SAVE!



CONTROL COSTS—CONTROL QUALITY

Wherever liquids are stored, mixed or consumed, you will be ahead to measure with Rockwell industrial meters. Then you'll control your costs, control your processes, control your end product quality.

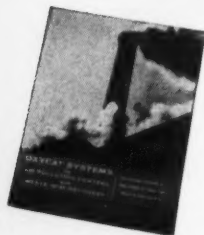
There's a Rockwell meter to measure most any liquid—oils, chemicals, paints, liquors, solvents, etc.—even corrosive fluids. Write for bulletin OG-400. Rockwell Mfg. Co., Pittsburgh 8, Pa.



Rockwell ER Meter with large reset register

Check 2095 opposite last page

HOW OXY-CATALYST SYSTEMS STOP INDUSTRIAL AIR POLLUTION— RECOVER WASTE HEAT



New brochure gives facts and figures on typical installations—send for your free copy now!

Oxy-Catalyst Systems for air pollution control and waste heat recovery are one of the most important and most effective solutions to these problems ever developed. Engineered to your individual requirements, they can clean up close to 100% of combustible pollutants and odors. They can also recover the waste heat in process exhaust gases; and they can often do both at once.

This new brochure tells how Oxy-Catalyst installations have stopped air pollution—often at an actual saving—in a wide range of industries. If air pollution is a problem in *your* operations, write for your free copy now.

OXY-CATALYST, INC. WAYNE 7, PA., U.S.A.

Catalysts for fume and odor elimination, air pollution control, and waste heat recovery

Please send me your new brochure on Oxy-Catalyst Systems for air pollution control and waste heat recovery.

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Firm _____
Street _____
City _____ Zone _____ State _____

Check 2096 opposite last page

Build Now

From preceding page

construction rate of recent months has, in some respects, been a welcome "breather." Many materials, especially alloy steels and structural shapes, have become more readily available at reduced prices. Some construction steel is less costly than a year ago, despite recent price increases, primarily because direct-from-mill shipments are available, with the resulting trimming of extra costs.

2) Productivity of construction labor has increased significantly. This has occurred mainly because more experienced workers have become available with the downturn in heavy construction.

Crews also are more efficient because delivery of material and equipment is rapid. Less

NEXT MONTH

What do the chemical companies say about their needs to expand present capacity, expressed in terms of their building plans? Second article in series on "Build Now" is survey of major chemical producing companies and their present expansion programs. Read the specific views of management — "We're Building Now" — in the November issue.

time is spent on marginal work while waiting for back-ordered material to arrive on the site.

Top union leadership also has realized that contractors and owners alike have been hard-pressed to keep costs within predetermined budgets. A concrete example of results of this attitude is the execution of recent national construction agreements, such as those signed by various International Unions and the National Constructors Association, a group of major industrial construction companies.

These agreements, backed by union officials, have eliminated isolated local practices that previously had reduced productivity.

3) Availability of construction financing has increased in

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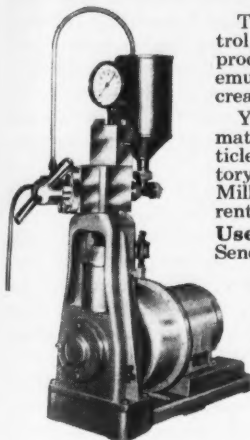
What's A "New Solution?"

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

INVESTIGATE DISPERSIONS and EMULSIONS TO INCREASE QUALITY, LOWER COSTS...with LABORATORY HOMOGENIZERS and COLLOID MILLS

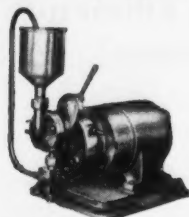


The Gaulin Laboratory Homogenizer handles a fixed capacity of 15 gph and pressures up to 8000 psi continuous and 10000 psi intermittent.

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Use Gaulin Experience! Send a sample of your product for Gaulin GTA analysis, or try Particle Control in your own laboratory. Laboratory Homogenizer or 2A Colloid Mill can be rented for only \$75.00 per month.



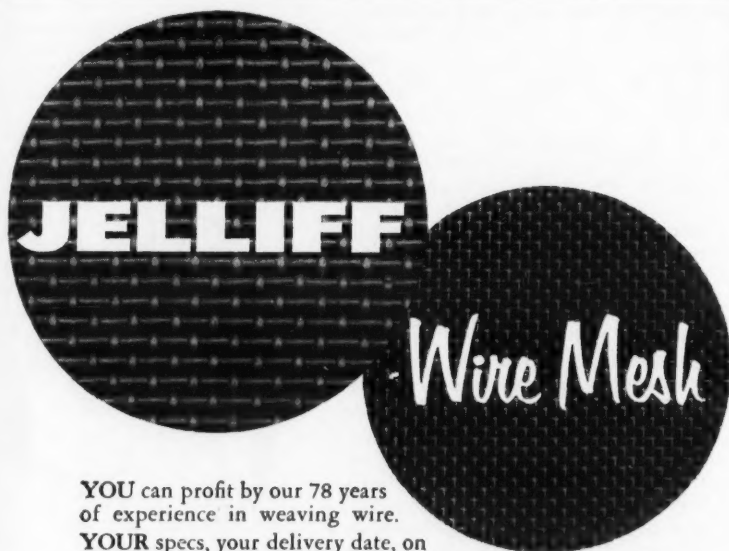
The Gaulin RE* Two-Stage Colloid Mill — Model 2A — is available for processing quantities as small as 8 ounces, and is invaluable for research, laboratory or pilot plant applications.



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most areas. Interest rates are slightly lower now than last year because of recent governmental actions. In general, bankers are optimistic about both long- and short-term potential of the chemical industry, although they still weigh any proposed project on individual merits.

**'Costs will advance
10% before end
of '59'**

**Robert S. Burns, President,
Standard Steel Corporation —**
We do not believe that chemical construction can be handled at less cost now than at



Robert S. Burns

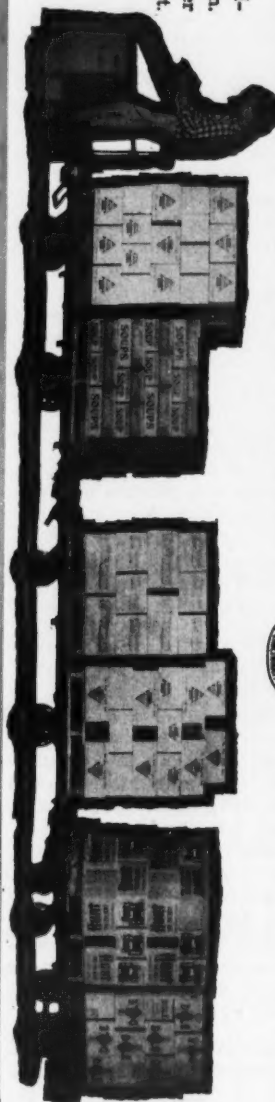
any time in the past. There certainly has been no reduction in labor or in basic material costs. However, we do believe that chemical construction can be handled now at less cost than in the future.

In our opinion, wages and the price of steel will continue to rise, and before the end of 1959, construction costs will advance approximately 10%. At the present time we have a substantial inventory of steel plate and component parts which were purchased lower than the current price. Therefore, our current prices are lower now than they will be when our inventory stock is replenished.

Also, for the first time in many years we are able to take substantial orders at a firm price, without the inclu-

To next page

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HydroLeetnic A GREAT NAME IN LIFT TRUCKS



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Check 2100 opposite last page

Some Things to Think About Steam Traps

...in order to get high operating efficiency and a minimum of maintenance

The gentleman who invented the wheel had a basic idea and so far no one has come up with anything better for the purpose.

If you'll pardon us for a little overemphasis on the significance of steam traps, we'd like to liken one of them to the wheel.

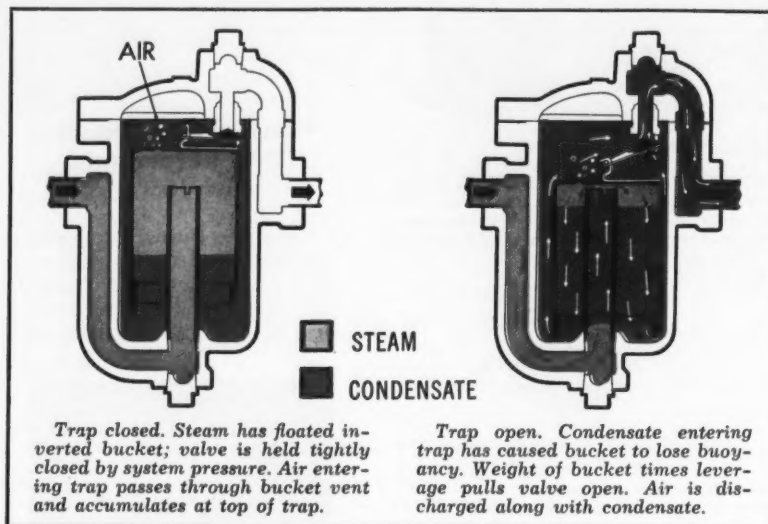
In 1911, when the first Armstrong inverted bucket steam trap model was announced to the world, or at least that part of the world that modest advertising and sales budgets would cover, it was not received with equal enthusiasm by all (especially old-style trap makers). But, like the wheel, it managed to find its way into general use. And, nothing better has ever turned up for the purpose of draining condensate. As a matter of fact, the Armstrong trap has been very widely copied. Today, there are more inverted bucket traps draining process equipment than any other kind. Of these, there are more Armstrongs.

If this sounds like the boasting of a proud parent, give consideration to some fundamental requirements not met by all traps:

1. **A steam trap should not leak steam.** Some traps do, you know, because of the nature of their operating principle. No steam ever gets to the Armstrong trap orifice. The valve is always water sealed.

2. **A steam trap should vent "air" as fast as it accumulates—**otherwise temperatures are reduced and corrosion is a problem. The Armstrong trap handles air very nicely. The vent in the bucket permits air to accumulate in the top of the trap, from where it is discharged when the trap opens. For extreme conditions like draining paper machine dryers, some jacketed kettles and certain other units, the vent is sized larger for the job. And, for handling big volumes of air during warm-up, a bucket with an auxiliary thermic vent really speeds up heating.

3. **A steam trap should discharge condensate at steam temperature** if you want to get



maximum efficiency from the unit drained. And most people certainly do. If you have to wait for the condensate to cool, it's almost impossible to maintain maximum temperatures and prevent air build-up. You guessed it—the Armstrong trap opens for water, without dependence on temperature.

4. **A steam trap should be suitable for any return system.** The Armstrong trap works just the same whether discharging to atmosphere, back pressure or vacuum. It has been conclusively proved that flash steam resulting from use of a bucket trap does not cause a problem in vacuum return systems. The flash condenses rapidly. It's the leaky traps that cause the headaches.

5. **A steam trap should not be a "prima donna".** Some kinds of traps take an awful lot of care and coddling. The Armstrong trap is a rough and ready type with a hardened chrome steel constitution (valve and seat, to be exact). It cleans itself of ordinary dirt and scale without choking up. Its 18-8 stainless parts stave off rust and corrosion. It resists wire-drawing and wear remarkably well. In fact,

it stays on the job longer with less attention than any trap ever produced. Unless you live in Siberia, you can probably find a user around the corner who will tell you so from experience.

6. **A trap should not be an "orphan".** With Armstrong traps you can *always* get prompt service and parts from nearby Factory Representatives and stocking distributors as well as from the factory.

7. **A trap should have a guarantee.** The Armstrong trap is unconditionally guaranteed to give you complete satisfaction (as to doing its job, that is). If it doesn't, you can get your money back.

If you'd like to buy some of these excellent steam traps, call your local Armstrong Representative or write Armstrong Machine Works, 8801 Maple St., Three Rivers, Michigan.

ASK FOR the 44-page Steam Trap Book, free on request without obligation.



ARMSTRONG STEAM TRAPS

Build Now

From preceding page

sion of an escalator clause.

It is true that all materials are now readily available. This is of vital importance to anyone about to build. Those who have built in the past few years know the frustration of having a plant 98% complete but unable to produce because of the delay in delivery of 1% to 2% of the items necessary for completion.

At the present time it is not necessary to hire the fringe workmen, and as a result, only the better artisans are employed. Also, the men who are now employed are using their best efforts to maintain their jobs, thus turning out more and better work per manhour than was customary in the past several years. Our present labor force is probably 10% to 15% more efficient than six months ago, which efficiency has enabled us to absorb recent increases in wages.

Any banker will verify that money is more readily available now than for the past several years. Interest rates vary in different sections of



"...and just how do you think I got where I am today, young man? By having the right answers at the right times, of course!"

Check 2101 opposite last page

CHIKSAN

the country, but are lower than last year.

For the past several years, anyone undertaking a construction program was desperately fighting for early production so as to get into the market for the end product as early as possible and before competitive programs. Such crash undertakings do not permit the economies that can be obtained from careful evaluation and deliberation. The result has been that many plants constructed in the recent past have cost far more than they should have, and even so now suffer from an inefficient operation.

Expediting for rush completion is costly in many ways. Under pressure, wrong decisions may be made as to where to effect economies. For instance, if the buildings exceed the budget, cheap equipment may be bought and operating efficiency may be sacrificed to save capital outlay. Companies who build now have an opportunity for better and more deliberate overall planning and will end up with an operation far more economical than those who wait until the next boom before commencing construction.

**'Recently quoted price
20% lower than
year ago'**

P. W. Wentworth, Executive Vice President, Vulcan-Cincinnati, Inc. — Chemical plant construction is less costly now. Costs of an erected plant are 10% to 20% lower than a year ago. We recently quoted a price for an erected plant that was at least 20% below that which we would have been able to quote a year earlier.

Two interrelated factors effect lower costs — time and "hunger" for business. Earlier deliveries of equipment mean shorter periods from contract to start-up. This results in material savings in overhead and other costs affected by the time factor. The "hunger" fac-

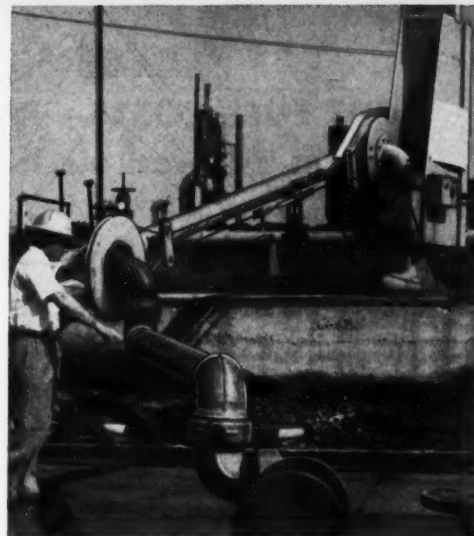


PREVENTS LINE HANDLING INJURIES SPEEDS BARGE LOADING ELIMINATES HOSE BURSTS SLASHES REPLACEMENT COSTS

The Chiksan Barge Loading Arm ends hazardous manhandling of loading hoses, eliminates dangerous dock clutter. Mechanical operation makes hookup fast and simple.

Gear reduction enables one man to adjust the flange position anywhere in a 105° vertical range. Outboard arm is manually swung into position at any point in a 130° horizontal arc. The eight inch model rotates 360° to permit servicing barges on both sides of a narrow dock. Once hookup is made, the arm can be left unattended while free wheeling allows the unit to ride free during loading and unloading. When not in use, the arm is raised up and out of dockside traffic.

6" x 25' and 8" x 28' sizes available. Handle petroleum products, both black and bright, and mild caustics in any temperature ranging between -60° F. to +225° F. Service all river and lake barges and lake tankers including those in 25,000 barrel class.

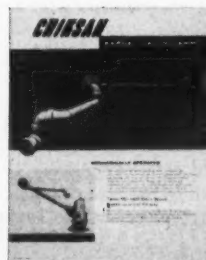


The Chiksan Barge Loading Arm is designed to reach approximately 20 feet from dock riser to barge flange. Total length of Arm is 25 feet.



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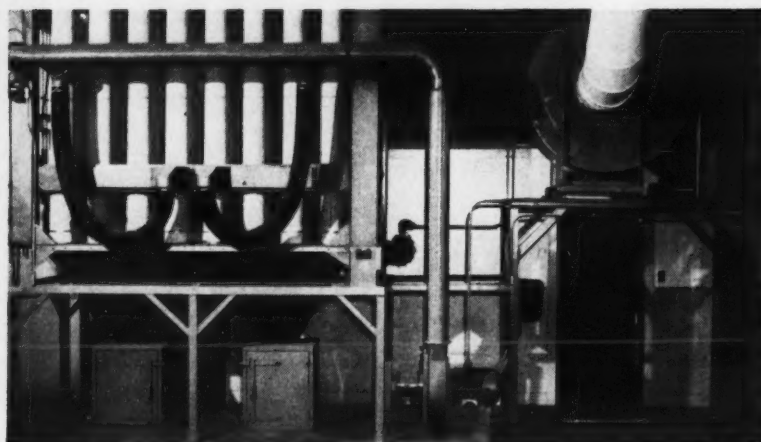
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DAY

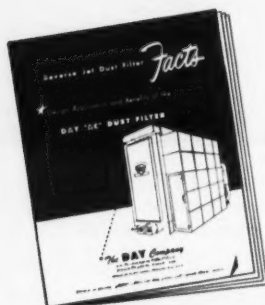
DUST CONTROL NEWS



An unboxed DAY "AC" dust filter* operating in work area of a manufacturing plant.

CUT FUEL COSTS—Return clean, warm, filtered air to work area

If you'll investigate, you'll find nearly all dust filters made are available only as housed units . . . BUT with DAY "AC" filters, housing is optional. Housed units are necessary when located outside or when placed on suction; UNHOUSED DAY filters can be placed in any convenient plant location. Using DAY UNHOUSED filters means you not only eliminate the cost of filter housing and exhaust piping but cut your fuel bills as well.



DAY "AC" filters are used to clean air in all types of industry . . . for filtering atomic energy dusts and even the air in oxygen manufacturing plants where the elimination of air pollution is most essential. For more information about DAY "AC" dust filters write for Bulletin F-75. It contains useful charts and air engineering data. Write to DAY for your free copy.

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EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 2103 opposite last page

Build Now

From preceding page

tor results in lower mark-ups by contractors, suppliers, and sub-contractors. There is also less escalation — many manufacturers are now quoting firm prices.

Materials are more readily available now. This means earlier delivery as well as lower costs. Delivery promises are more realistic, resulting in fewer delays and an earlier on-stream plant.

Labor is more effective, although this varies with the work area as usual. We recently completed field erection of a plant in less than three months which had been ex-



P. W. Wentworth

pected to require five months. Our superintendent estimated that labor was at least 30% to 40% more effective than normal. At another location, a plant was completed earlier than expected because the field labor worked more effectively than we have witnessed in several years.

Money does seem to be available and at lower rates. A recent project involving re-financing an existing plant resulted in competitive offers from several "backers".

Building a chemical plant requires the lapse of six months to two to three years. To be ready for the predicted upturn requires greater capacity — new plants must be built now. Because process and design talent is not as thinly spread, better and more efficient plants can be built at lower costs. The worsening international situation may interfere with industrial construction a few months hence.

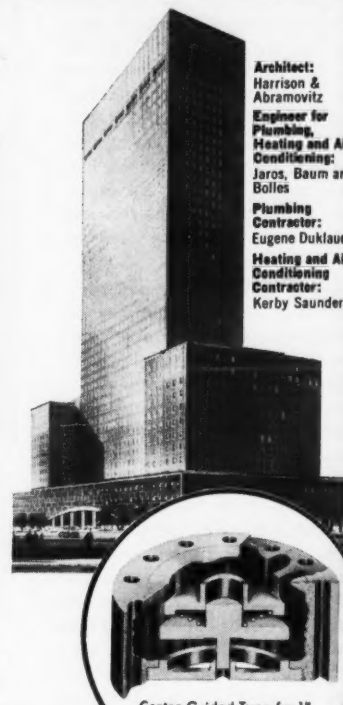
Water-Hammer

PROTECTION

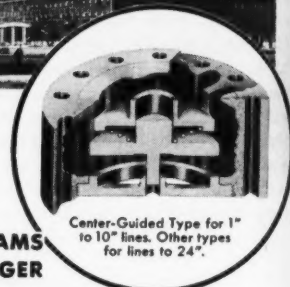
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Check 2104 opposite last page

CHEMICAL PROCESSING

'Materials are available, labor more effective'

C. B. Wigton, President, Wigton-Abbott Corporation — It has been our experience that chemical construction cost is between 6% and 12% lower today than it was a year ago.

Materials are more readily available. This availability cuts the cost of construction since there is no delay in shipment or procuring the needed materials. Over-all time of construction is speeded up and projects can start and reach completion on schedule.

Labor is more effective today. This is due principally to



C. B. Wigton

a more selective market within the labor force. The increased skill of labor has risen to a maximum of 10% above its previous capacities in the postwar period.

Money is available for the right type of structures: projects that have a universal appeal and are not limited to one operation but have the qualities necessary for flexibility and expansion. We have found that the best form of financing is short-term loans at the standard rate of 3½%.

The question of when to build, now or later, must take into consideration how effective your existing installation is and the competitive advantages a new plant would give you. Since the quality of the labor market is high and the availability of material presents no problem, the physical aspects of construction are excellent at this time.



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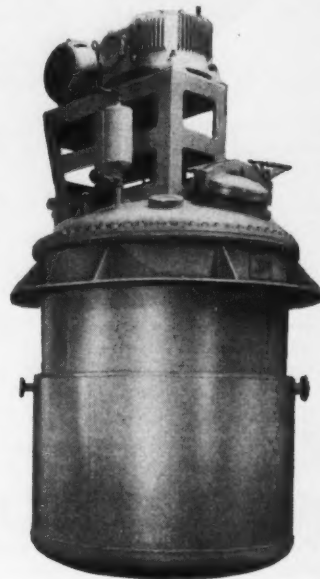
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Some of the many design advantages of "Series 16" magnets

Increased magnetic strength; strongest available • Comparable or greater magnetic area than other separators • Insulated against loss of magnetic effectiveness • No sharp corners—safest, fastest and easiest to clean • Optional face plates for abrasive, corrosive or sanitary use • Units can be gasketed for liquid or dust-tight applications

FREE! BIG 6-page fact-filled folder tells the complete "Series 16" story. Full descriptive data, charts, graphs, actual installation photos, "how to order" information, etc. Be sure to get your copy. Write today to Eriez Mfg. Co., 73KA Magnet Drive, Erie, Pa.

New "Series 16" magnets proved strongest, most efficient units made . . . provide ultimate in operating advantages at price of ordinary magnets

New HI-POWR magnets give you a new "high" in protection against tramp iron damage or contamination by iron fines. Protects machinery, prevents product contamination, reduces downtime, increases production.

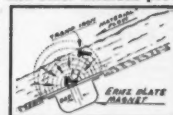
Exclusive Eriez design and construction provide peak magnetic efficiency and performance—actual tests show "Series 16" magnets trap and hold more metal from material flows than other units. Heavy duty non-removable extruded aluminum cover takes the roughest use . . . increases structural rigidity . . . prevents pilfering or tampering with magnetic circuit and loss of magnetic power.

ONLY ERIEZ OFFERS PLATE MAGNETS DESIGNED FOR YOUR EXACT APPLICATION . . .

When you choose an Eriez "Series 16" Separator, you are assured of obtaining a unit designed to provide the finest type of separating efficiency for your operating conditions. Years of leadership in engineering and application know-how have gone into building these models to meet industries' diversified needs. "Series 16" Plates are available in three magnetic strengths . . . standard, part stainless or all stainless steel construction

. . . in single, double or triple row assemblies as one integral unit . . . with smooth face plates, liquid tight face plates, tapered step plates and open air gaps. Various strengths alone won't do the job . . . take advantage of the most versatile line available . . . get the separator best suited for your exact needs!

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Magnetic SEPARATION AUTOMATION VIBRATION Equipment

ERIEZ

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NEW 72-page GAGE and CONTROL Catalog

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to use
them...

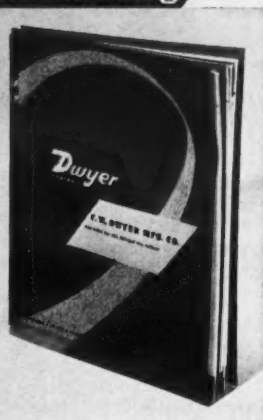
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Creative Research

From page 39

long-range projects and cherishes freedom in following his own bent, it is a good idea, if at all possible, to keep assignments rather generalized. Aside from helping to keep the researcher happy, it will probably lead to more ideas. As Admiral Rickover, the man primarily responsible for the atomic submarine, has said, "The best atmosphere is one where the only limitation is that of the scientist himself."

Incubation. Probably one of the major problems in research management has been the fact that it is difficult for people trained in other areas to recognize when their creative people are "working" and when they aren't. To the executive of the old school who likes to see busy hands wherever he goes, a group of creative researchers operating in high gear probably looks appalling. To his eyes, they may seem to be just sitting around looking like they are trying to remember something.

Part of Subconscious

Actually the most important part of the cycle of creative thinking takes place in the subconscious mind of the researcher. The ideal approach to the solution of a problem follows six steps: gathering of information, attempt at solution, frustration, incubation, a leap of imagination, and communication. When a researcher reaches the frustration point he should try to move the problem into his subconscious.

The important element in the incubation period is not simply relaxation, however; it's getting the mind on something else. Some companies encourage hobbies to give the researcher something to occupy the time. However, if he has an alternate project to turn to — something not too closely related to the project that has frustrated him — it ought to serve at least as well.

Reward. After the "big idea" is brought forth, verified, and communicated to whomever should know about it, the researcher isn't ready to simply forget the whole business.

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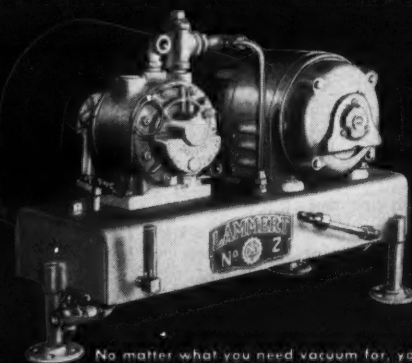
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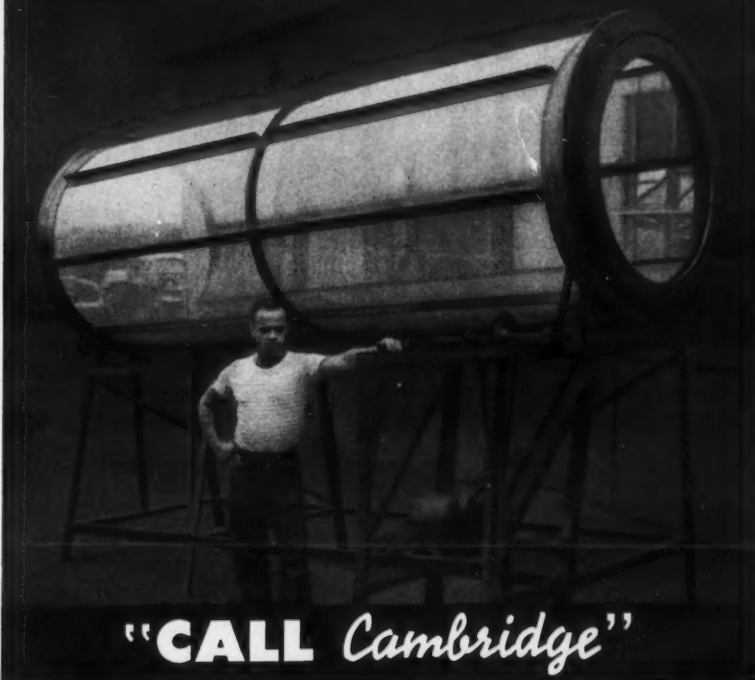
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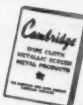
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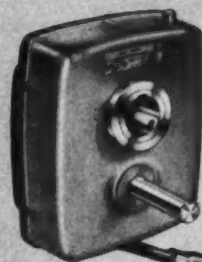
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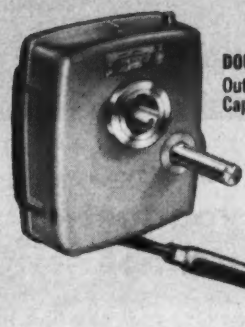
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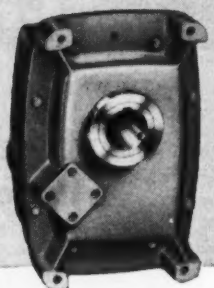


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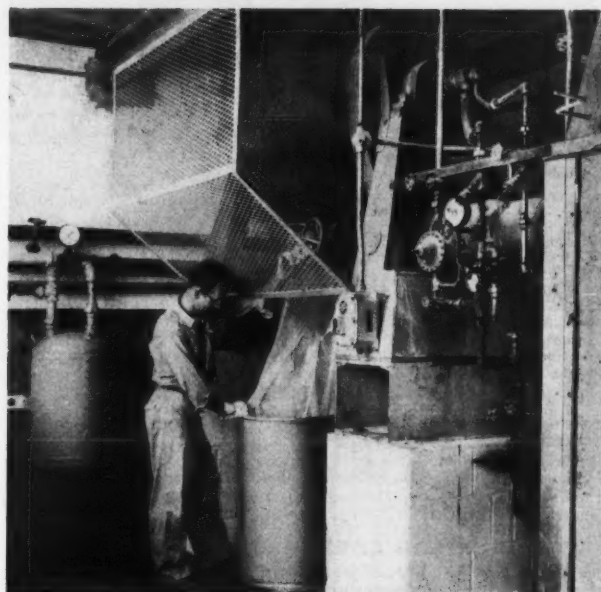
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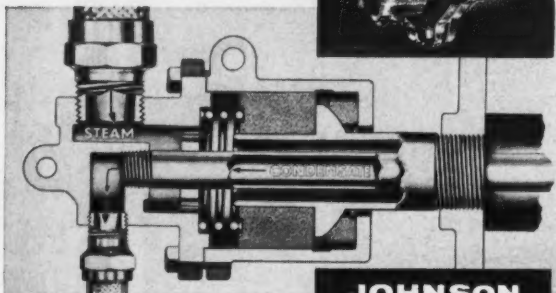
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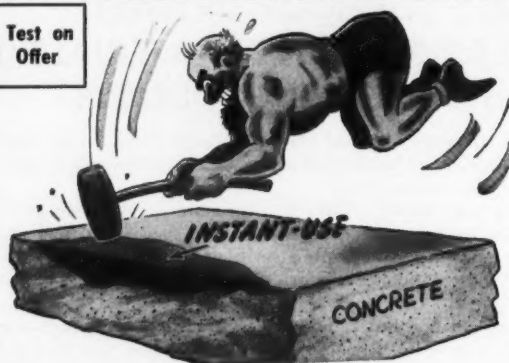
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Creative Research

From page 238

In the first place he needs to know if his idea is being used, and, if so, how it's working. Nothing frustrates a researcher so much as the feeling that the ideas he is producing are simply being filed away in a drawer somewhere. Secondly, being human, he'd like to be told — by as many people as possible, but particularly by management and scientific colleagues — that his work was of merit.

Recognition Vital

Recognition is a vital part of creativity. Hardly any creative person, whether he's an artist, composer, writer, scientist or whatever, creates only for his own amusement.

There are a number of ways of according researchers recognition for the work they do, ranging from testimonial dinners and national publicity for major breakthroughs, to mention in the company house organ. Posting progress reports on projects, keeping them up from inception to production, for example, would not only be a form of recognition, but would satisfy that other basic urge of researchers — their interest in what becomes of ideas.

Of course, there are the old stand-bys, money and titles. Because a good scientist may not necessarily be a competent executive, some companies have created titles which carry no management functions but give status to an exceptionally valuable research man.

The usual management "answer" to the creativity problem, is to simply give researchers more money. But even if the research budget allowed substantial across-the-board pay increases, management might be disappointed in the results. The reason is, as I've tried to outline above, that other factors are often much more important.

In order to spark the leaps of imagination which yield the big ideas needed in today's technology race, it is necessary to set up the right permissive environment. Properly cultivated, our creative gardens can be significantly more fruitful.

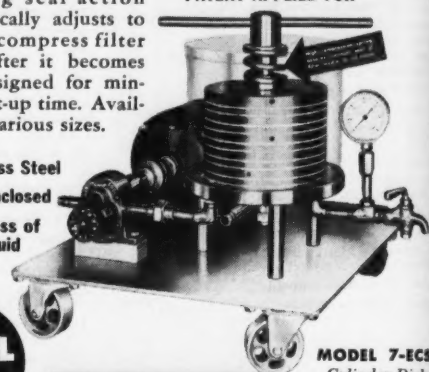
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<input type="checkbox"/> 1861	<input type="checkbox"/> 1909	<input type="checkbox"/> 1956	<input type="checkbox"/> 2003	<input type="checkbox"/> 2050	<input type="checkbox"/> 2097
<input type="checkbox"/> 1862	<input type="checkbox"/> 1910	<input type="checkbox"/> 1957	<input type="checkbox"/> 2004	<input type="checkbox"/> 2051	<input type="checkbox"/> 2098
<input type="checkbox"/> 1863	<input type="checkbox"/> 1911	<input type="checkbox"/> 1958	<input type="checkbox"/> 2005	<input type="checkbox"/> 2052	<input type="checkbox"/> 2099
<input type="checkbox"/> 1864	<input type="checkbox"/> 1912*	<input type="checkbox"/> 1959	<input type="checkbox"/> 2006	<input type="checkbox"/> 2053	<input type="checkbox"/> 2100
<input type="checkbox"/> 1865	<input type="checkbox"/> 1913	<input type="checkbox"/> 1960	<input type="checkbox"/> 2007	<input type="checkbox"/> 2054	<input type="checkbox"/> 2101
<input type="checkbox"/> 1866	<input type="checkbox"/> 1914	<input type="checkbox"/> 1961	<input type="checkbox"/> 2008*	<input type="checkbox"/> 2055	<input type="checkbox"/> 2102
<input type="checkbox"/> 1867	<input type="checkbox"/> 1915	<input type="checkbox"/> 1962	<input type="checkbox"/> 2009	<input type="checkbox"/> 2056	<input type="checkbox"/> 2103
<input type="checkbox"/> 1868*	<input type="checkbox"/> 1916*	<input type="checkbox"/> 1963*	<input type="checkbox"/> 2010	<input type="checkbox"/> 2057	<input type="checkbox"/> 2104*
<input type="checkbox"/> 1869	<input type="checkbox"/> 1917	<input type="checkbox"/> 1964	<input type="checkbox"/> 2011	<input type="checkbox"/> 2058	<input type="checkbox"/> 2105
<input type="checkbox"/> 1870	<input type="checkbox"/> 1918	<input type="checkbox"/> 1965	<input type="checkbox"/> 2012	<input type="checkbox"/> 2059	<input type="checkbox"/> 2106
<input type="checkbox"/> 1871	<input type="checkbox"/> 1919	<input type="checkbox"/> 1966	<input type="checkbox"/> 2013*	<input type="checkbox"/> 2060	<input type="checkbox"/> 2107
<input type="checkbox"/> 1872	<input type="checkbox"/> 1920	<input type="checkbox"/> 1967	<input type="checkbox"/> 2014	<input type="checkbox"/> 2061	<input type="checkbox"/> 2108
<input type="checkbox"/> 1873	<input type="checkbox"/> 1921	<input type="checkbox"/> 1968	<input type="checkbox"/> 2015	<input type="checkbox"/> 2062	<input type="checkbox"/> 2109
<input type="checkbox"/> 1874	<input type="checkbox"/> 1922	<input type="checkbox"/> 1969	<input type="checkbox"/> 2016	<input type="checkbox"/> 2063	<input type="checkbox"/> 2110
<input type="checkbox"/> 1875	<input type="checkbox"/> 1923	<input type="checkbox"/> 1970	<input type="checkbox"/> 2017	<input type="checkbox"/> 2064	<input type="checkbox"/> 2111
<input type="checkbox"/> 1876	<input type="checkbox"/> 1924	<input type="checkbox"/> 1971	<input type="checkbox"/> 2018	<input type="checkbox"/> 2065	<input type="checkbox"/> 2112
<input type="checkbox"/> 1877	<input type="checkbox"/> 1925	<input type="checkbox"/> 1972	<input type="checkbox"/> 2019	<input type="checkbox"/> 2066	<input type="checkbox"/> 2113
<input type="checkbox"/> 1878	<input type="checkbox"/> 1926	<input type="checkbox"/> 1973	<input type="checkbox"/> 2020	<input type="checkbox"/> 2067	<input type="checkbox"/> 2114
<input type="checkbox"/> 1879	<input type="checkbox"/> 1927	<input type="checkbox"/> 1974	<input type="checkbox"/> 2021	<input type="checkbox"/> 2068	<input type="checkbox"/> 2115
<input type="checkbox"/> 1880	<input type="checkbox"/> 1928	<input type="checkbox"/> 1975	<input type="checkbox"/> 2022	<input type="checkbox"/> 2069	<input type="checkbox"/> 2116
<input type="checkbox"/> 1881	<input type="checkbox"/> 1929	<input type="checkbox"/> 1976	<input type="checkbox"/> 2023	<input type="checkbox"/> 2070	<input type="checkbox"/> 2117
<input type="checkbox"/> 1882	<input type="checkbox"/> 1930	<input type="checkbox"/> 1977	<input type="checkbox"/> 2024	<input type="checkbox"/> 2071	<input type="checkbox"/> 2118
<input type="checkbox"/> 1883	<input type="checkbox"/> 1931	<input type="checkbox"/> 1978	<input type="checkbox"/> 2025	<input type="checkbox"/> 2072	<input type="checkbox"/> 2119
<input type="checkbox"/> 1884*	<input type="checkbox"/> 1932	<input type="checkbox"/> 1979	<input type="checkbox"/> 2026	<input type="checkbox"/> 2073	
<input type="checkbox"/> 1885	<input type="checkbox"/> 1933	<input type="checkbox"/> 1980	<input type="checkbox"/> 2027	<input type="checkbox"/> 2074	
<input type="checkbox"/> 1886	<input type="checkbox"/>				

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THAT'S INTERESTING

Buck Rogers move over

Wright ADC has awarded Lear, Inc., a contract to study requirements for manned space flight and, on the basis of research, to design and build a model crew capsule for a space vehicle. (*Lear-log*, Lear, Inc.)

Tech info deluge

Although population of US is increasing at rate that will double number of Americans every 50 years, number of tech articles published doubles every 22 years. (*Chemical Abstracts*, American Chemical Society)

Gold threads among hi-fis

A gold alloy strip only 80-millionths of an inch thick — 40 times thinner than a human hair — has been developed to produce hi-fi response of modern stereo and monaural recording heads.

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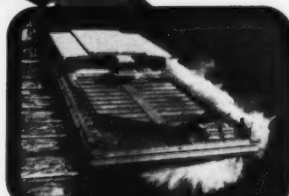
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Typical audience reactions:

Bishop, Tex.—“Planning fair-sized test after seeing this film.”
Louisville, Ky.—“Answers many questions. Second showing arranged.”
Cincinnati, Ohio—“Key personnel evidenced considerable interest.”
Netherlands Antilles—“Both shows led to 45-minute discussions.”
Fairport, Ohio—“Very interesting. Will try methods shown.”
Las Piedras, Venezuela—“Putting ideas to work in near future.”
Bartlesville, Okla.—“Viewed by 42 key men from five divisions.”

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Check 2119 opposite last page

